SIEMENS

UROSKOP ACCESS

SP

Startup

System

for FLUOROSPOT Compact Imaging System

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Document revision level

The document corresponds to the version/revision level effective at the time of system delivery. Revisions to hardcopy documentation are not automatically distributed.

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Requirements

Tools and Auxiliaries Required

NOTE **All tools, measuring and auxiliary devices with the exception of the standard installation tools are listed in the Service Tools Catalogue (part of the Spare Parts Catalogue).**

5 m service cable	99 00 440 RE 999
Centering cross	96 60 051 RE999
Densitometer, e. g. DensiX-LE 52003[1]	97 02 416 X1996
Digital multimeter, e. g. Fluke 8060 A	97 02 101 Y4290
ESD equipment type 8501 - 3M	97 02 606 Y3121
Ground wire tester[2]	44 15 899 RV090
Line resistance meter	84 28 104 RE999
mAs meter	81 60 400 RE999
Oscilloscope, e. g. Fluke Scope 3390 A	99 00 861 RE999
Phase-sequence indicator	97 02 713 X7933
Precision X-ray filter	99 00 598 XE999
PTW DIADOS Required for measuring the skin dose rate only in areas where the DHHS regulations apply (otherwise not required for testing at start-up, unless there are deviations and resetting is necessary).	97 17 612 Y0388
Resolution test type 41/42	28 71 820 RE999
Safety Tester Unimet 1100[3]	51 38 727 Y0766
Service PC as specified in ARTD-001.719.06...	n.a.
Set of Cu filters (10 pcs. of 0.3 mm Cu each)	44 06 120 RV090
SMFit light field luminance meter	88 81 281
Water bucket > 5 l and measuring cup for 1 l of water	n.a.

1. Has to be ordered at following address:
PEHA med Geraete GmbH
Muehlstrasse 38
65843 Sulzbach
Germany
Phone (+49) 61 96-5 00 40 30
Fax (+49) 61 96-5 00 40 50
(see also http://www.pehamed.de)

2. The safety tester Unimet 1100 can be used as replacement for this measuring equipment
3. This universal test meter can be used for testing the electrical safety of medical equipment per DIN VDE 0751 and EN 60601.

Additionally Required Documents

Acceptance Test Certificate § 16	
ARTD "Safety and Radiation Protection Guidelines"	ARTD part 2 (ARTD-002.731.02)
FLC Online Help for UROSKOP Access	SPL5-330.880.01
FLUOROSPOT Compact; Software; Installation of Application SW	SPL5-330.816.02
Installation Protocol	SPL5-330.813.02
Medical Products; Safety Information; General Safety Notes	TD00-000.860.01
Online System Help	n. a.
POLYDOROS SX 65/80 Wiring Diagram	RX63-055.844.01
Quality Assurance; IQAP	SPL5-330.820.02
Siemens Remote Service; Installation of SRS	SP00-000.816.02
SP Planning Guide UROSKOP Access	SPL5-330.891.01
Test Certificate POLYDOROS SX 65/80	
Test Certificate UROSKOP Access	
Troubleshooting Guide; Endoscopy Option	SPL5-330.840.01
UROSKOP Access Online Help	SPL5-330.880.01
UROSKOP Access System Circuit Diagram	SPL5-330.844
UROSKOP ACCESS User Manual	SPL5-330.620.02

Safety Information

General Safety Information

⚠WARNING **Danger of damage to property, injury, death!**

Non-observance can lead to damage to property, injury or death.

Observe the general safety advices

- **in this document,**
- **in the document TD00-000.860.01 and**
- **the safety advices according ARTD part 2.**

General Safety Information - Electrical

⚠WARNING **Electrical safety!**

Non-observance can lead to damage to property, heavy injury till death.

- **After opening of the covers live parts are accessible. To prevent danger the system has to be disconnected from mains supply prior to opening of covers.**
- **Are works under voltage necessary, the general safety advices according TD00-000.860.01 have to be observed.**

⚠CAUTION **Live parts!**

Non-observance can lead to damage to property.

- **Observe the ESD guidelines for works at the system.**

Voltage-conducting Parts (Generator off)

Generator

- Before working on the generator, switch the generator off at the "power off"-switch on board D160.

⚠WARNING

With the generator switched off, line voltage is still applied to transformer T1 and to the D160 closing circuit (see POLYDOROS SX 65/80 circuit diagram). After the generator has been switched off, a direct voltage of approx. 600 V remains applied to the inverter! This is indicated by LEDs V35 and V36 on board D110.

Non-observance can lead to damage to property, heavy injury till death.

- **The voltage drops to 0V within approx. 2 minutes; the LEDs go out at approx. 30 V. The warning notes (labels) in the generator cabinet must be observed.**

Imaging System

⚠WARNING

With the generator switched off, a line voltage of approx. 400 V remains applied to the M16 (power supply module) of the imaging system (see System Circuit Diagram).

Non-observance can lead to damage to property, heavy injury till death.

- **Set the system power switch at control console to the "Off" position to disconnect the imaging system including all its components from the mains supply .**

Unit

⚠WARNING

After disconnecting the drive converters from the voltage supply, voltage-conducting parts of the equipment and power connections of the Lenze drives must not be touched immediately as the capacitors may still be charged. After disconnection hazardous voltage is still present at the Lenze drives for up to 5 minutes through the DC link capacitors.

Non-observance can lead to damage to property, heavy injury till death.

- **No work must be performed on the motors or the DC link terminals of the Lenze drives until after this period has passed. The warning notes (labels) on the Lenze drives must be observed.**

Safety Information - Radiation

⚠WARNING **Radiation!**

Non-observance can lead to illnesses, irreversible damage to body cells and heritable information till death.

- **During work at the system, when radiation has to be released, the safety and radiation protection guidelines according ARTD-002.731.02 have to be observed.**
- **Observe that:**
  - existing radiation protection devices are used,
  - radiation protection clothes are worn,
  - the distance to the source of radiation is as large as possible,
  - radiation is only released if necessary,
  - the set-up values are as low as possible (low kV and mA values, short switch-on time).

Safety Information - Mechanical

⚠CAUTION **Danger of burns at hot parts or components!**

Non-observance can lead to light till to medium burns, especially of the hands.

- **After the opening of covers parts and components (esp. cooling elements, high-performance parts) are accessible which can show temperatures > 50°C.**
- **To prevent burns through touching parts and components the system has to be switched off and has to cool down for at least 5 minutes.**

⚠CAUTION

Danger of injuries on mechanical parts! After the opening of covers parts like plugs, threated bolts, shortened cable fixations and edges of components can be touched which could lead through a lack of advertency to contusions, abrasions and cuts of the skin, esp. of the hands.

Non-observance can lead to light till to medium injuries, especially of the hands.

- **Carry out such works with special advertency and carefulness.**
- **Wear suitable protective gloves.**

Switching off High Voltage/Radiation

- To avoid unintentional release of high voltage or radiation, set the switch (S1) SS on D100 to "Off" (no activation of inverters).

Disabling Unit Movements

- Before performing any service or maintenance work on the unit, actuate a red emergency stop button.

  Emergency buttons are located at the front of the unit, on the side of the foot-end lifting base cover and on the control console.

Product-Specific Information

Country-Specific Acceptance Test Certificates

The following tests and checks for acceptance tests required in Germany according to the X-ray Ordinance, §16, (Röntgenverordnung) and for acceptance tests in the USA have been performed in factory and recorded on the test certificates:

- Visual check of filter values,
- Fluoroscopic field limitation,
- Centering of radiation field center and monitor center,
- Fluoroscopic dose rate,
- Functional check of the Iontomat measuring fields,
- Maximum skin dose rate,
- Resolution and minimum contrast,
- Check of kV accuracy,
- Accuracy of X-ray tube voltage,
- Accuracy of voltage indication during fluoroscopy,
- Reproducibility of radiation.

NOTE	**These measured values as well as the values determined at system startup can be copied from the test certificate to the acceptance test certificates.**

The following tests and checks required according to the DHHS regulations must be performed:

1. Documents required for the customer
2. Radiation protection
3. Checking of DHHS and identification labels

Information on Startup

- The system must be completely cabled.
- The system has been preassembled, programmed and tested in the factory.
  The test certificates are filed in the blue system binder.
- When starting up the system, verify that the settings have not changed by performing the necessary tests and measurements.

Entering the FLC Service Mode

The service mode is intended for Siemens service only and is protected by a password.

The service mode is started at the FLC when the "Settings" tab card (Fig. 1) is selected in the patient list and subsequently the "Service" icon (Fig. 2).

NOTE	**The corresponding password is listed in the SP Password List, which is published in the CS Knowledge Base.**

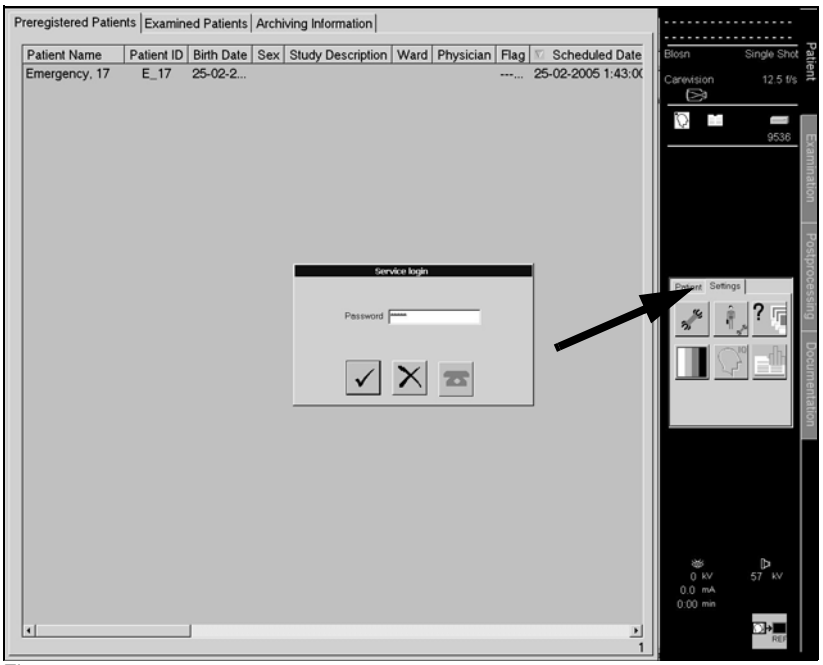

Fig. 1


Fig. 2

If the entry is accepted, the service window appears with the following menu bar (Fig. 3).

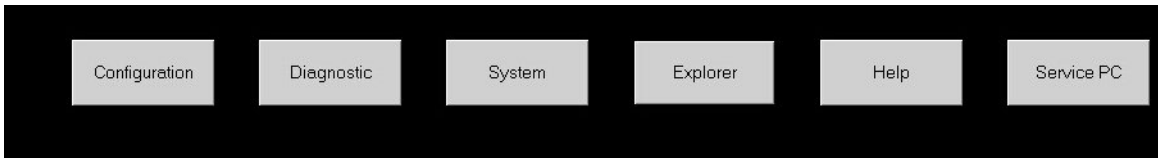

Fig. 3

NOTE

Under "Help" (Fig. 3) you will find the Online Help that describes the individual steps. The "FLC Online Help for UROSKOP Access" has been installed at the factory.

The Online Help is shipped on CD included in the system binder.

Conventions and Abbreviations

D	Optical density of the film
D	Detail (sensitivity of screen)
DIV	Division (settings of oscilloscope)
D_N	Net optical density (D - fog)
DR	Exposure
ESD	Electrostatically-sensitive device
f_K	Correction factor for the dose detector
FLC	FLUOROSPOT Compact imaging system
Fluoro	Fluoroscopy
H	High (sensitivity of screen)
I.I.	Image intensifier
IQAP	Image quality assurance protocol
K_B	Dose, dose rate measured in the image receptor plane
K_T	Dose, dose rate measured on the tabletop
LP	Line pair
m	Unit attenuation factor
NAT	Network address translation
PG	Planning Guide
R_G	Visual resolution
ROW	Rest of the world
S	Speed of a film-screen system
SID	Source-image distance
SPC	Service PC
SS	Service switch
SSW	Service software
SW	Software
U	Universal (sensitivity of screen)
UI	User Interface of imaging system
US	Ultrasonic

Tolerances

General Tolerances for Measures of Length According to ISO 2768

Limits for nominal size range	over 3 mm to 6 mm	over 6 mm to 30 mm	over 30 mm to 120 mm	over 120 mm to 400 mm	over 400 mm to 1000 mm	over 1000 mm to 2000 mm	over 2000 mm to 4000 mm
Permissible tolerance	**± 0.5 mm**	**± 1 mm**	**± 1.5 mm**	**± 2.5 mm**	**± 4 mm**	**± 6 mm**	**± 8 mm**

- These tolerances apply to all dimensions specified in these instructions unless a different tolerance is expressly stated after the value.

Tightening Torques

- The permissible tolerance for tightening torques stated is **± 10 %**.

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Checks and Tests

Testing the Protective Ground Wire

NOTE	**The following first ground wire test must be performed for the safety of startup personnel.** **The final ground wire test is performed at the end of the startup procedure. Therefore the documentation applies only to the final ground wire test which delivers the initial measurement value.** **The measurement value of the final protective ground wire test is used as a comparative value for subsequent measurements and must be documented.**

- Perform the ground wire test according DIN VDE 0751, part 1 (ARTD part 2). It has to be ensured that the system is completely installed, all covers are attached and all ground wire connections have been made. Test the protective ground wire resistance between the protective conductor bus bar for the entire system or the protective contact at the unit plugs and any accessible, conductive part of the product that can accept voltage in cases of error.

The acquired measuring values have to be documented and evaluated together with information about the used measuring device (type and serial number).

The protective ground wire resistance may not exceed 0.2 Ohm.

NOTE	**Ensure that control or data cabeling does not affect ground wire connections.**

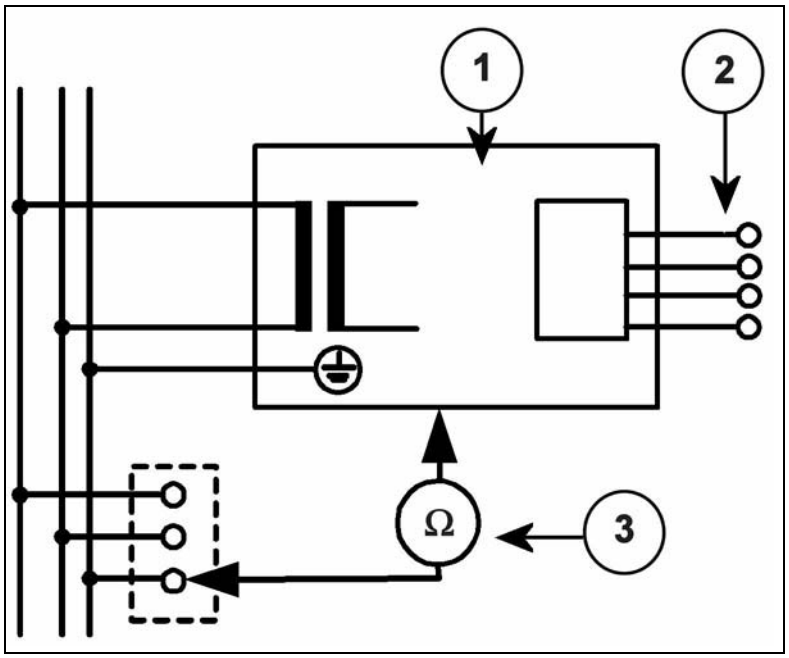

Fig. 1 Measurement circuit for protective ground wire measurement of systems with hard-wired connections; according DIN VDE 0751-1:2001-10, C3
1 = System
2 = Applied part type B
3 = Measurement application (integrated in measuring device)

Determining the Veiling Luminance

- To do this, measure the veiling luminance using an approved luminance meter with the diagnostic image display devices in the usual operating position.
- The room lighting is adjusted to the brightness required for the relevant medical application (check with the user), using a dimmer and scale, for example.
- The diagnostic monitor remains switched off.
- Using the luminance meter, measure the veiling luminance of the diagnostic monitor at a distance from the monitor to be specified by the manufacturer.
- If the veiling luminance is less than 2 cd/m^2, it can be expected that the minimum requirements of the acceptance test for image display devices which is to be performed later will be met.
- If, however the veiling luminance is higher, the operator and/or site supervisor must be notified immediately so that corrective measures can be taken (further defined reduction of illuminance, covering of windows, etc). Also refer to the relevant note in the project manager's manual or document "SP Planning Guide; UROSKOP Access" (PG).

NOTE

To avoid any problems during acceptance tests for monitors according to DIN 68 68-57, the lighting conditions in the control room and examination room must be tested as early as possible.

These measurements are necessary to ensure that the minimum requirements for acceptance and constancy tests for image display devices according to DIN 68 68-57 are fulfilled.

Mains Connection

Measuring the Line Voltage

- Remove the blade-type fuses M16.F1, F2 and F3 (document "POLYDOROS SX 65/80 Wiring Diagram").
- Switch off the automatic circuit breaker F456.
- Switch system contactor "on".

- Measure the line voltage at terminal strip M16.K20 at the terminals L1, L2, L3, N, PE.

  The voltage must correspond to the specifications in the "Test certificate UROSKOP ACCESS" (filed in system binder).
- Switch system contactor "off".

Checking for Correct Phase Sequence

- Connect the phase-sequence indicator to terminals L1, L2 and L3 (mains side).
- Switch system contactor "on".

- Check the rotating field and correct, if necessary.
- Switch system contactor "off".
- Disconnect the phase-sequence indicator.

Measuring the Internal Line Resistance (Mains Quality)

- Connect the line resistance meter to M16.L1, L2, L3 (document "POLYDOROS SX 65/ 80 Wiring Diagram") and measure the internal line resistance (phase against phase successively).
- Connect the line resistance meter between each 2 phases of L1, L2, L3.
- Switch system contactor "on".

- Perform the measurement.
- Switch system contactor "off".
- Reconnect the meter and perform the measurement for the other phases.
- Reinsert the blade-type fuses M16.F1, F2 and F3 and switch on the automatic circuit breaker F456.

NOTE **For maximum generator output the internal line resistance measured must not exceed the following values (Tab. 1).**

U_{mains}	max. R_{mains} with POLYDOROS SX	
	65 kW	80 kW
400 V	0.17 Ohm	0.11 Ohm
440 V	0.20 Ohm	0.14 Ohm
480 V	0.24 Ohm	0.16 Ohm

Tab. 1 Internal line resistance

- Record the measured values in the "Test certificate UROSKOP ACCESS".
- If the internal line resistance is higher, the tube current must be limited correspondingly as described in subchapter "Limitation of Tube Current".

Limitation of Tube Current

NOTE **In case that the internal line resistance fits according Tab. 1 the limitation of tube current should be checked (default value: 800 mA).**

- Start the XCS SSW and select the menu "Configure/Site Structure".

  The following window appears.

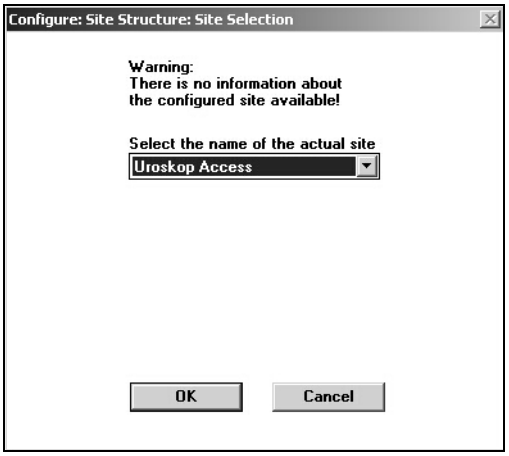

Fig. 2 Configure: Site Structure: Site Selection

- Select "Uroskop Access" in the drop-down menu "Select the name of the actual site" and confirm with "OK".

  The following window appears.

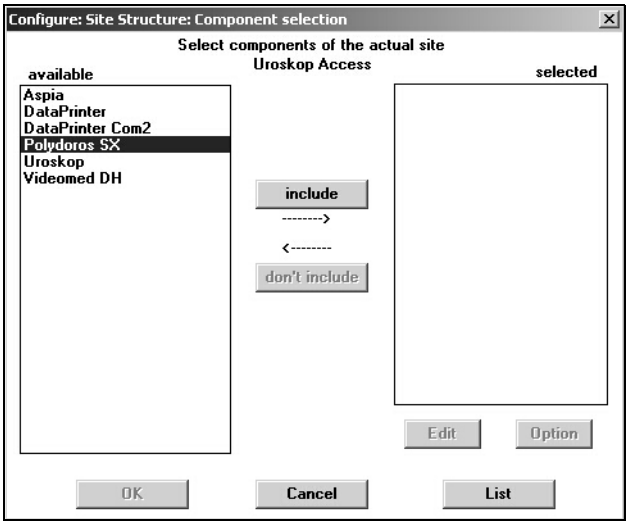

Fig. 3 Configure: Site Structure: Component Selection

- Select "Polydoros SX" under "available" and confirm with "include".

  The following window appears.

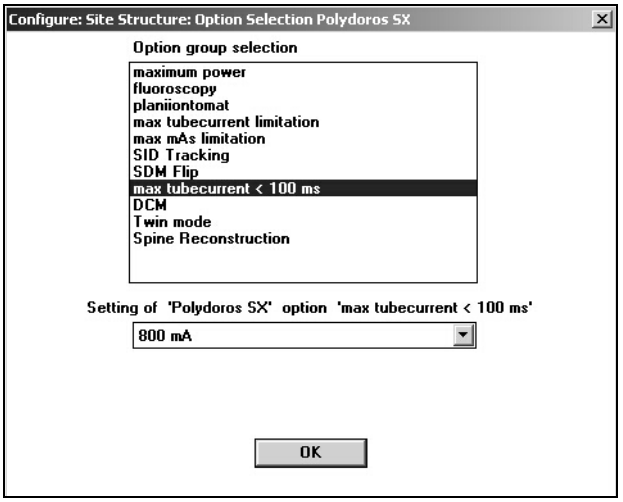

Fig. 4 Configure: Site Structure: Option Selection Polydoros SX

- Select "max tubecurrent limitation" under "Option group selection".
- Enter a reduced equivalent value for the parameter.

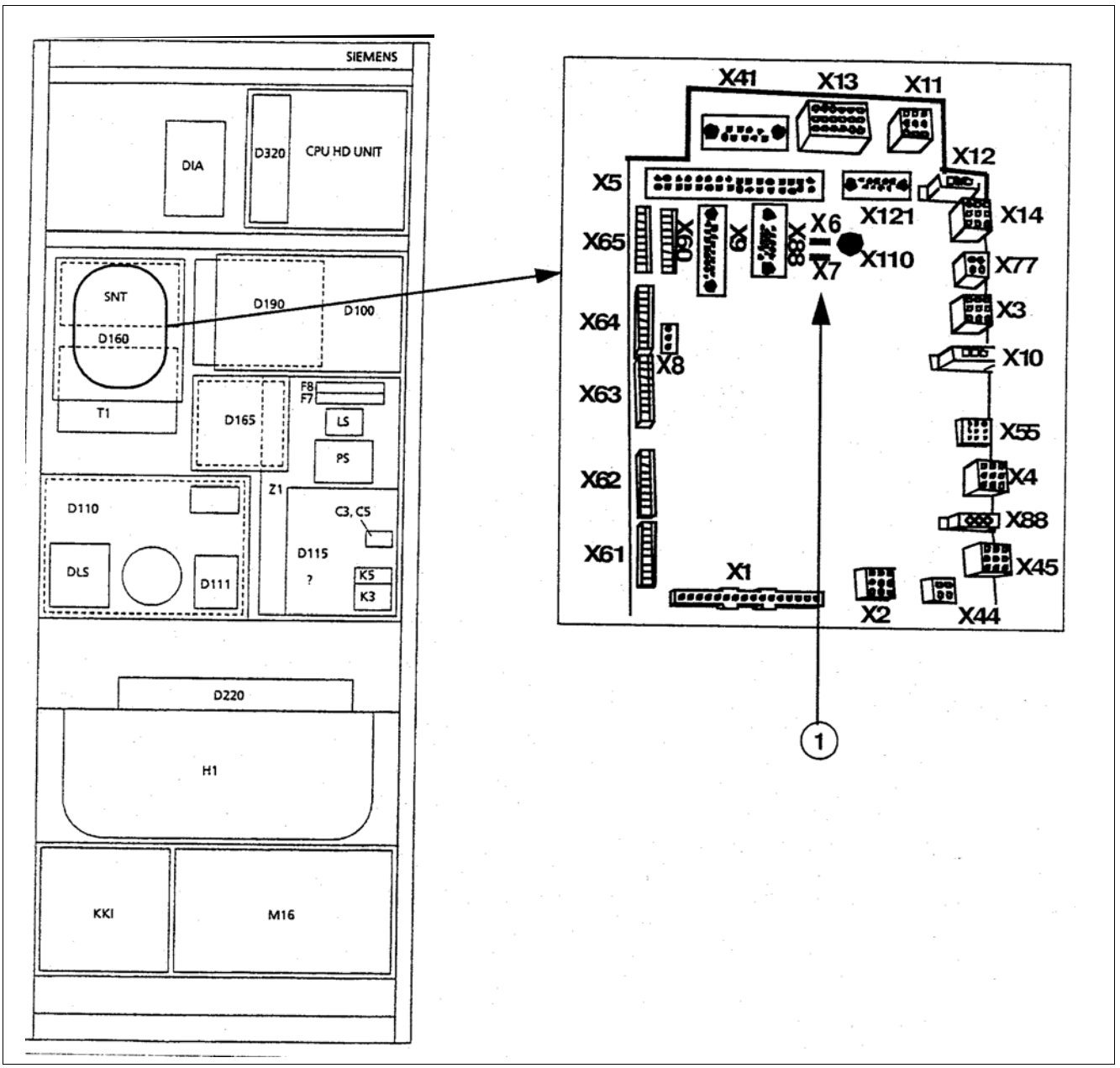

Fig. 5 Polydoros SX65/80 - D160

Checking for Inadmissible Ground Connections

- After separating the connection between PE and $0V_L$, measure in the generator power cabinet if there are any inadmissible ground connections.
- Remove jumper X6-X7 (1/Fig. 5) on D160.
- Measure the resistance between X6 ($0V_L$) and X7 (PE).
- The resistance must be > 30 kOhm for the wired system.
- Reinsert jumper X6-X7 on D160.

Switching on the System (Imaging System)

- On D100 in the generator, set the switch (S1) SS to "off" (no activation of inverters).
- Switch on the system at the control panel.
- The imaging system is ready for operation after approx. 3 minutes.

Functional Test of VIDEOMED DHC

LED	Function
Green	Voltage supply ok
Orange	Input/output ok
Red	Lights up during exposure

Tab. 2 Overview of signal LED's on the DHC camera

Functional Test of the XCS Network

- The general function of the XCS network is indicated by the following 7-segment displays and LED's:

POLYDOROS SX65/ 80	XCU/D320	V11 V12	"0" point flashing "0" point flashing green LED "Com-HW": on
	D100	V14	"b" is displayed, point flashing

Tab. 3 XCS

NOTE **If errors are shown on the 7-segment displays, refer to the XCS SSW (Help menu).**

Installing the SSW/Online Help on the Service PC

XCS Service Software

The CD-ROM "Uroskop Access System SW" containing the XCS SSW can be found in the blue system binder.

The backup of the system parameters is on the "site data disk".

NOTE	**Do not use an old XCS SSW version. Before installing the new software, any existing old XCS SSW directories must be renamed, e.g. to "SSWold". The directory "c:\SSW" proposed during the installation is preassigned. Do not change it! Only use the XCS SSW supplied with the system.**

- Start Windows on the service PC.
- Insert the CD-ROM "Uroskop Access System SW" into the CD-ROM drive.

NOTE	**The CD will start automatically if the autorun function is enabled at your service PC.**

- Select "Start/ Execute" after selecting the "Start" button.
- In the command line, type "<CD-ROM>:\flcompact" and confirm with "Enter".
- A "UROSKOP ACCESS SYSTEM SW CD" window appears, which has to be confirmed with "OK".

  Following menu window appears.

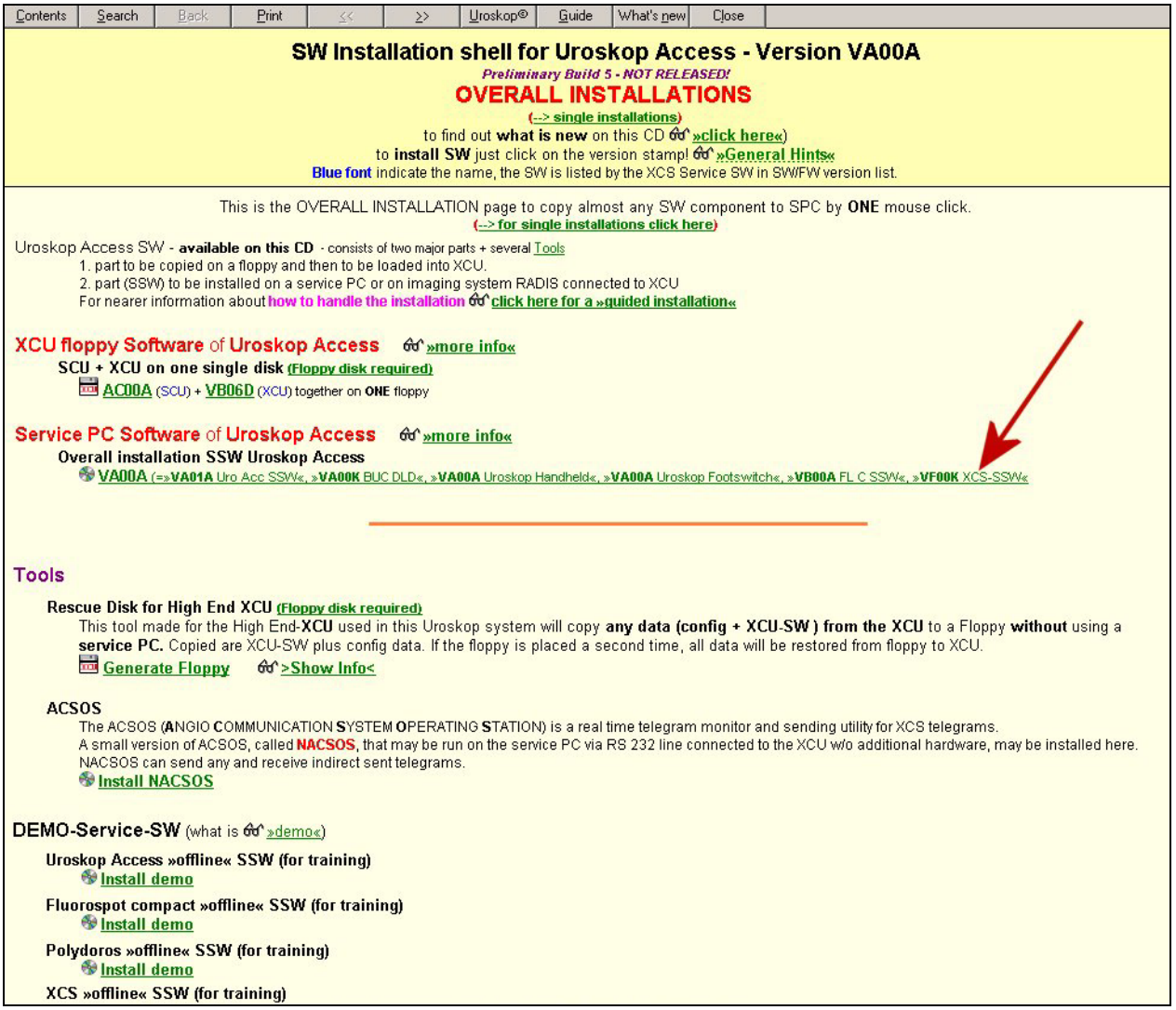

Fig. 1 Main menu - Uroskop Access System SW

- Click the green marked menu "XCS-SSW" and follow the further instructions.

UROSKOP Access Online Help

The UROSKOP Access Online Help is content of the "Uroskop Access System SW" CD.

- Perform the installation of the Online Help as described above for installing the XCS-SSW.
- If the installation main menu appears (Fig. 1), scroll the menu down and select the installation option in the "Hilfe-Dateien/Help Files" menu.

Connecting the Service PC to the Generator

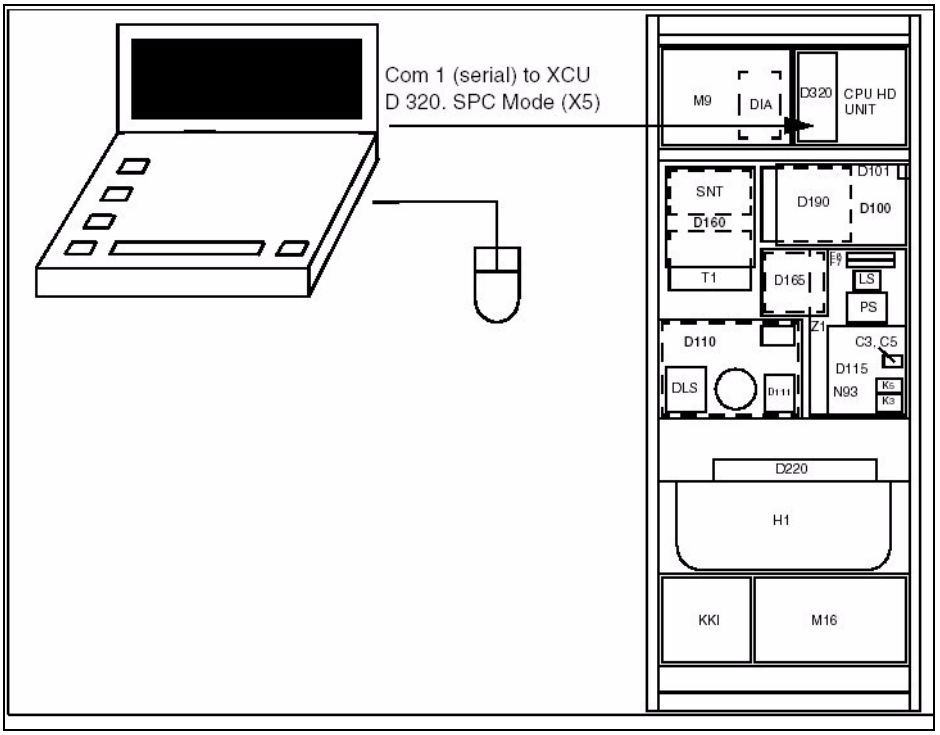

Fig. 2 Connection of Service PC

- Connect the service PC to the POLYDOROS SX65/80 generator as shown in (Fig. 2)

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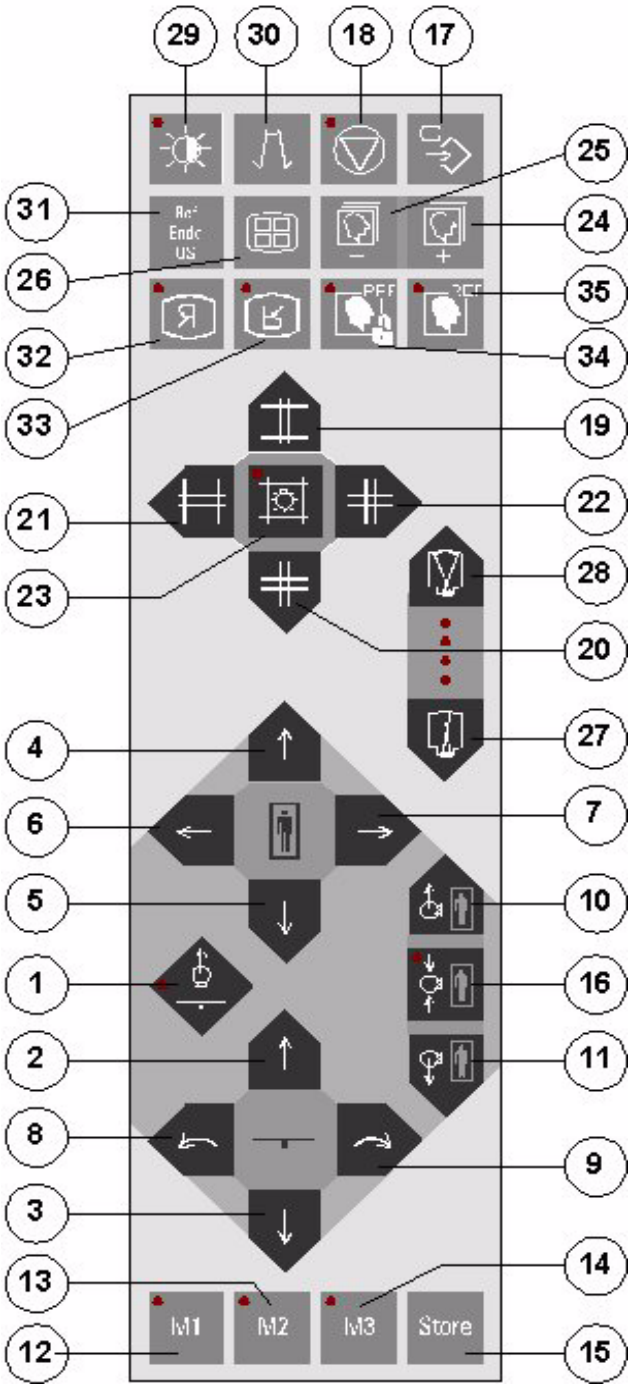
Tableside Control Unit (Overview)



Key functions
1) Tube unit park position
2) Lift table
3) Lower table
4) Table longitudinal headwards
5) Table longitudinal footwards
6) Table transverse left
7) Table transverse right
8) Table tilt left
9) Table tilt right
10) System longitudinal headwards
11) System longitudinal footwards
12) Memory 1
13) Memory 2
14) Memory 3
15) Store position
16) Exposure pos. system longitudinal
17) Store ATB image
18) Fluoro automatic stop
19) Height diaphragm open
20) Height diaphragm closed
21) Width diaphragm open
22) Width diaphragm closed
23) Light localizer / full format
24) Image +
25) Image -
26) Split screen
27) Zoom +
28) Zoom -
29) Windowing (W1, W2)
30) Edge Enhancement (F1, F2, F3)
31) Ref/Endo/US selector
32) Preselect flip vertical (left/right)
33) Preselect flip horizontal (head/foot)
34) Store reference image
35) Recall reference image

Fig. 1 Tableside control unit

System Foot Switch (Option)

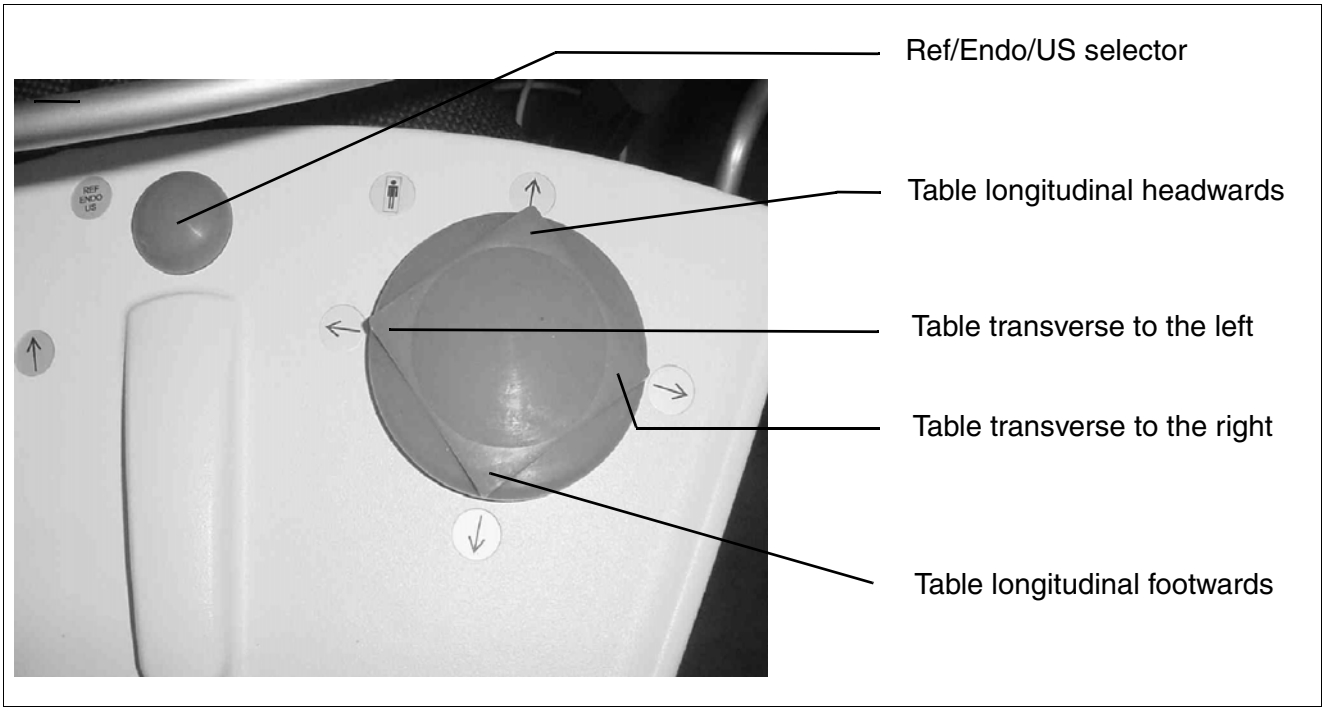


Fig. 2 System footswitch - 1

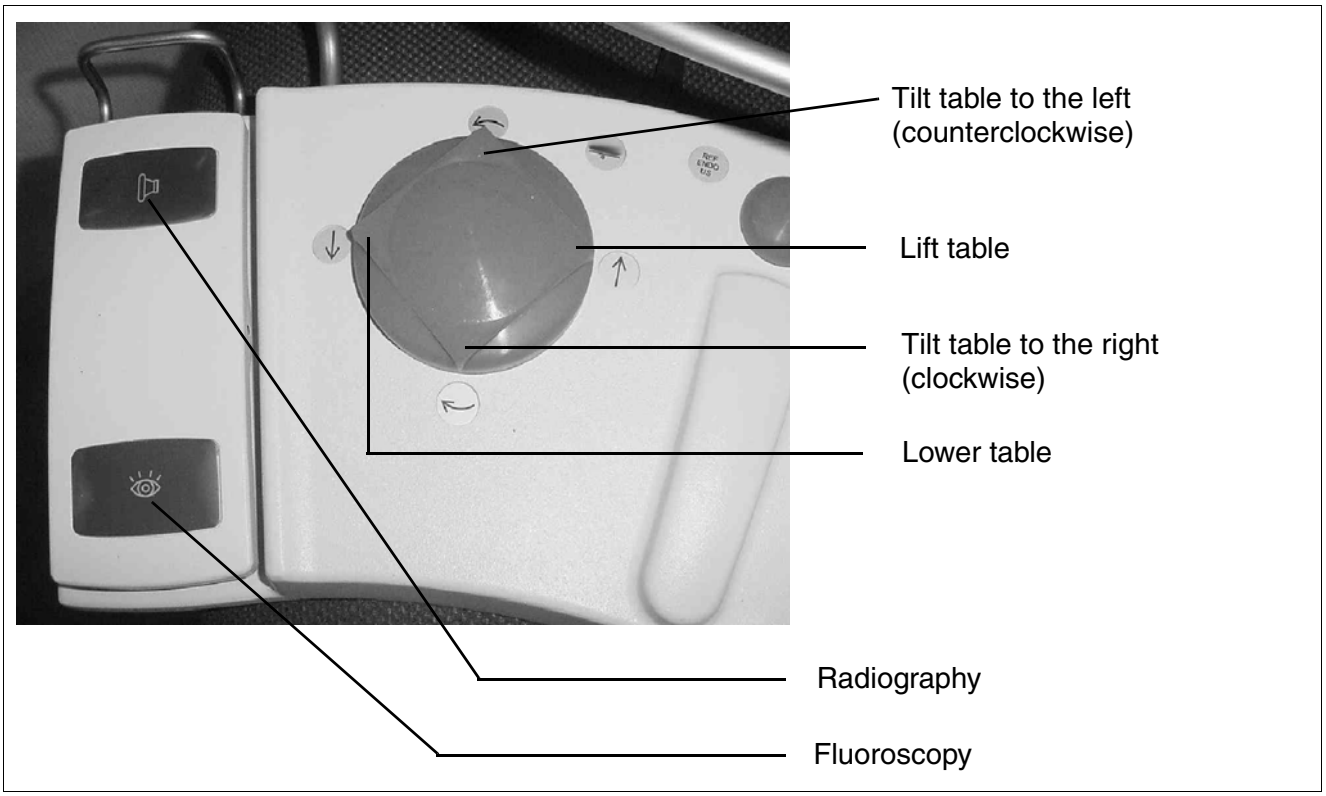


Fig. 3 System footswitch - 2

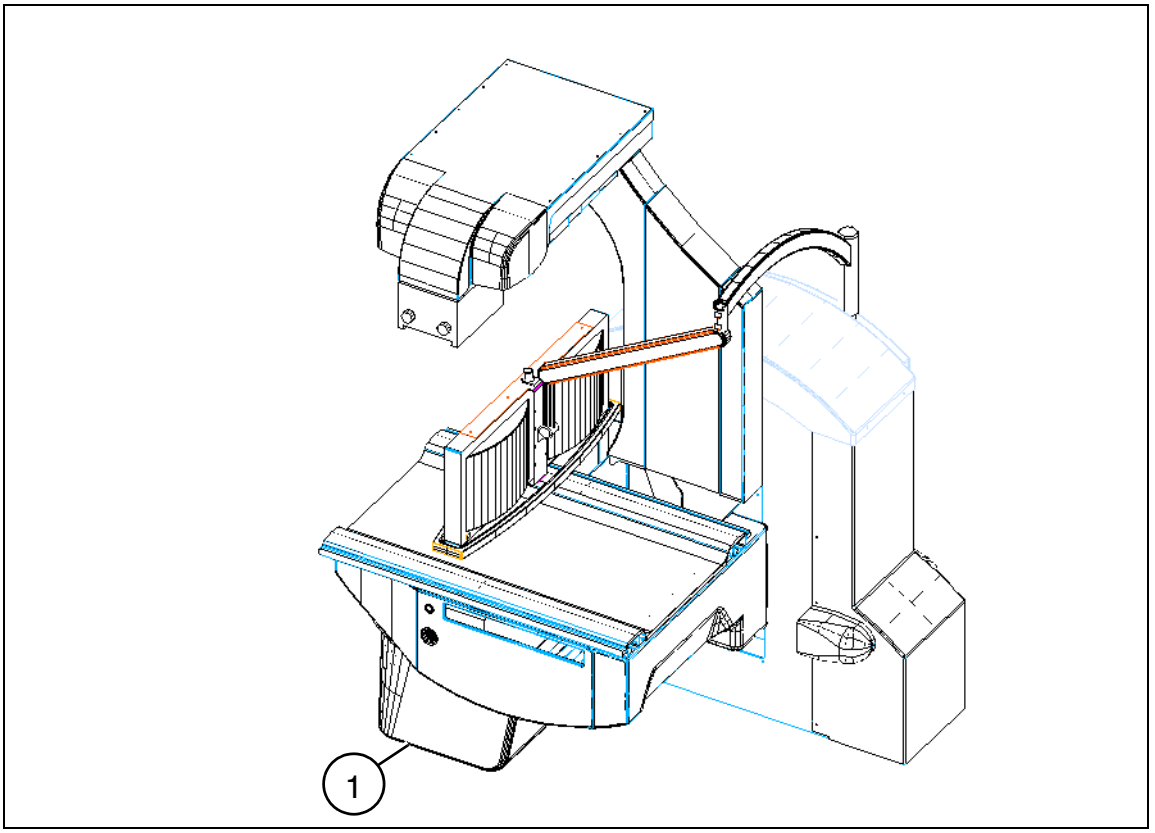


Fig. 4 UROSKOP Access

Safety Limit Switches

NOTE	**Risk of crush injuries!** **When performing the following test of the safety limit switches ensures that no unintentional unit movements are initiated.**

I.I. Collision Protection

- Operate manually the safety devices (1/Fig. 4).

  The safety contactors drop out audibly.

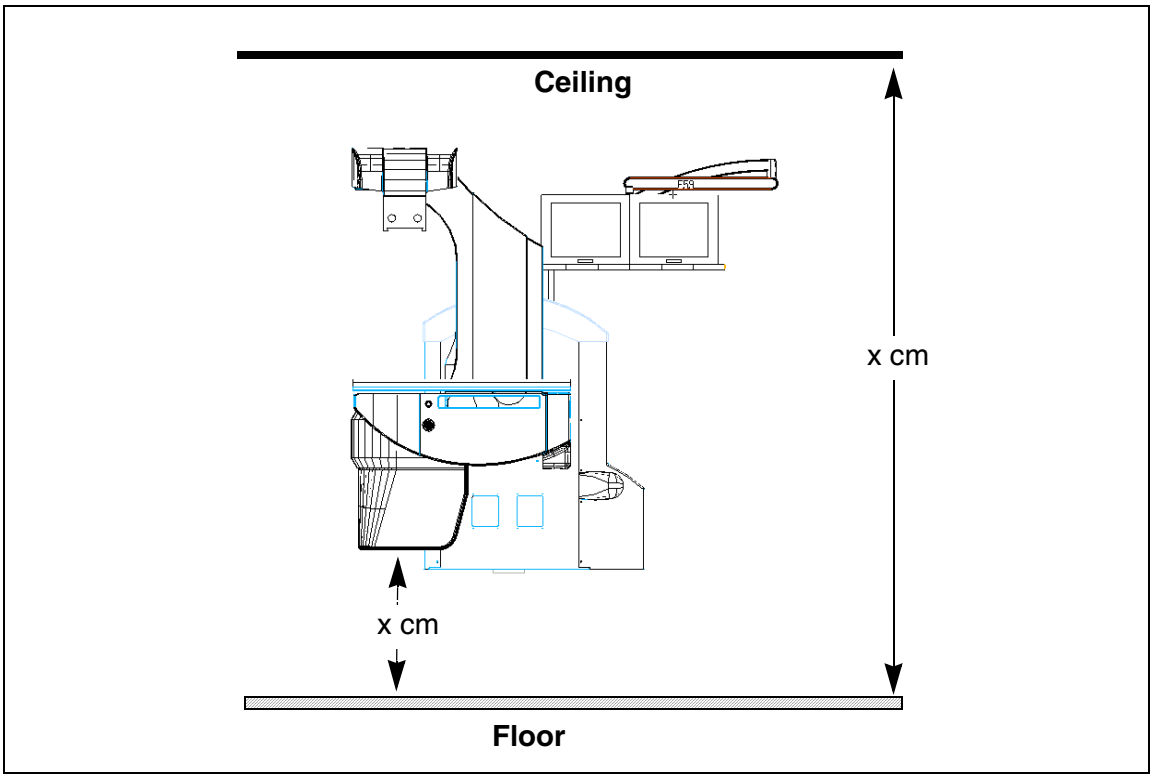


Fig. 5 Room dimensions

Room Dimensions

NOTE	**The collision computer allows the attachment of a footboard at the head-end and foot-end, i.e. for calculation purposes the table length is considered to be extended by 30 cm at both ends.**

A: Ceiling Height

- Measure the distance from the floor to the ceiling (Fig. 5).

B: Distance from the Floor

- Measure the minimum distance from the floor to the image intensifier (without I.I. collision protection) (Fig. 5).

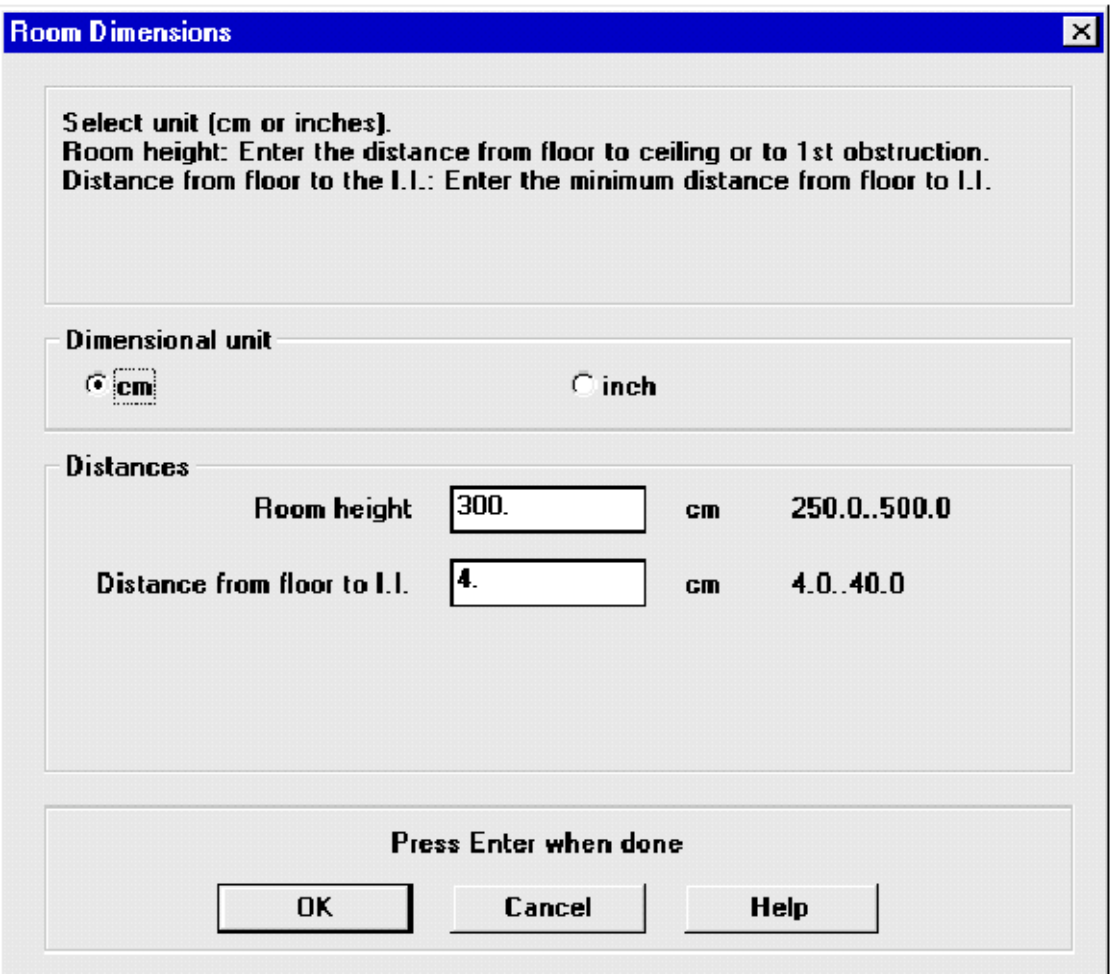


Fig. 6 Room Dimensions

- Select "Components/ UROSKOP ACCESS/ Adjustments/ Room Dimensions" in the XCS SSW.
- Enter the "Room height" and the "Distance from floor to I. I." in the "Room Dimensions" window of the SSW and confirm with "OK" (Fig. 6).

  The factory default value "Distance from floor to I. I." is "6" cm.

NOTE	**Only valid for UROSKOP Access with 33 cm I. I.!** **The default value for "Distance from floor to I. I." is 10 cm.**

NOTE	**The distance 4...40 cm entered in the SSW refers to the distance between the bottom edge of the I.I. and the floor and must be at least 4 cm.** **The distance between the I.I. collision protection and the floor is therefore approx. 2 cm smaller.**

Checking the Distance from the Floor

- Move the unit in the 0° position.
- Position the unit in the center of the travel range and move it to the minimum table height.
- Measure the distance from the lowest point of the I.I. to the floor (Fig. 5).

  Desired value: D ≥ 4 cm
  - If the distance D is < 4 cm, record the difference to the desired distance.
  - Move the unit from the lowest position of the lifting base to the highest position.
  - Increase the input value for "Distance from floor to I.I." by the difference recorded.
- Check the distance by moving the unit into the lowest position of the lifting base again.
- Terminate the XCS SSW.
- Switch the system off.
- Shut the system down completely and then switch it on again.

Tabletop

Checking Footward Tabletop Movement

- Position the tabletop approx. flush with frame.
- Move the longitudinal carriage approximately in the center of the travel range.
- Position the unit completely upright.
- Lower the tabletop all the way to the end position.
- Measure the distance from the floor to the lowest point of the tabletop.

  Desired value: Distance from the floor approx. 34 cm (without footboard)
- For units with attached footboard, lower the tabletop further towards the floor and measure the distance.

  Desired value: Distance from the floor at least 4 cm.

Unit Movements

- Check the functions of the keys on the tableside control unit and optional system foot switch diplayed in chapter "System Foot Switch (Option)" and chapter "Tableside Control Unit (Overview)" .
  - The tableside control unit must be tested in all plug locations of the basic unit.
- Move the TFT support arm to the park position.
- Check that all unit movements are carried out smoothly and without any considerable noise.
- Perform all unit movements in sequence, actuating an emergency stop button during each movement.

  The movements must be interrupted on actuation of the emergency stop button and enabled again once the respective emergency stop button has been unlocked.
- Set a tilting angle of 0° and move the tube out of the exposure position.

Radiation release must be disabled.

- Move the tube back into the exposure position.
- Move the TFT support arm out of the park position.
- Perform a tilting movement.

  Tilt movement is possible only in the range ± 15° and (± 85° to 90°).
- Move the TFT support arm back into the park position.

- Release Fluoro and press the emergency stop buttons in sequence while radiation is being released.

NOTE	**In each case, radiation must be switched off on actuation of the emergency stop button.**

- It must be possible to release radiation again for Fluoro with the emergency stop button pressed.
  - The drives remain disabled for as long as an emergency stop button is pressed.
- Lower the table and activate the collision protection at the bottom of the I.I. during the downward movement.

  On activation of the collision protection the downward movement must be disabled for as long as the collision protection is activated.

Starting up the Generator

Testing the Generator without High Voltage

Testing the Starter

- Switch S1 "off"(switch SS on PC board D100 in the generator).
- Register a new patient in the patient list.
- Select fluoroscopy.
- Actuate the exposure release button.

  The rotating anode runs up.
- Release the exposure release button.

  The rotating anode is slowed down.

Testing the Generator with High Voltage

Warming up the Tube Assembly

- Switch SS "on"(switch S1 on PC board D100 in the generator).
- Close the collimator fully and cover the I. I. input with a lead apron.

- Perform the menu item "Warm-up" in the XCS SSW menu.

  The "Warm-up" menu is processed automatically.
- Follow the automatic procedure and confirm with "OK" at the end.

  The "Preheating" menu is called automatically.
- Follow this automatic procedure and confirm with "OK" at the end.

  The "Filament correction" menu is called automatically.
- Follow this automatic procedure and confirm with "OK" at the end.

  The "Filament pushcurrent" menu is called automatically.
- Follow this automatic procedure and confirm with "OK" at the end.
- Check the parameters in the menu "Diagnostic > Adjustment Results > Tube Adjustment Params"

  The following values have to be met.
- Switch the system off and on again.

Focus	Preheating [mA]	Filament Correction MUL	Filament Correction ADD	Filament Push Current P-Factor
small	2.200 - 2.900	0.9 - 1.2	-700 - +700	< 1.09
large	1.800 - 2.200	0.9 - 1.2	-700 - +700	1.09 - 1.6

Tab. 1 Default values - tube warm-up

Checking the max. Generator Output

- Remove the I.I. voltage supply (Z108, fuse F10, in the generator cabinet) [for reasons of protection of I. I. and TV camera].
- Place the lead apron on the I.I. input in addition.
- Select "Components > POLYDOROS SX > Diagnosis > Nominal Power" in the XCS SSW und select following parameter:
  - Tube 1,
  - Large focus,
  - 100 kV,
  - 65 mAs (65 kW) or 80 mAs (80 kW) depending on the nominal power of the generator,
  - 3 point technique,
  - 100 ms.
- Connect the oscilloscope to the following measuring points on board D100 to check the tube voltage and current.

Oscilloscope channel CH1	D100.X61 and D100.X61 AGND	1 V ≙ 20 kV
Oscilloscope channel CH2	D100.X64	1 V ≙ 200 mA 1 V ≙ 1 mA
Trigger	D100.X64.SWR	12

Tab. 2 Table D without header cells

- Release exposure and measure the kV and mA values with the oscilloscope.
- Determine the maximum output from the kV and mA values measured as follows:

$$P_{max} = \frac{kV \cdot mA}{1000} (kW)$$

Fig. 7

- Enter the output (kW) calculated and the current (mA) measured into the "Test certificate UROSKOP ACCESS".
- Reinsert the I.I. power supply (Z108, fuse F10, in the generator cabinet).

Checking the Fluoroscopic Field Limitation and Centering

NOTE

The TV camera centering and the fluoroscopic field limitation have been set in the factory. Ensure that these default settings have not changed during transport and installation.

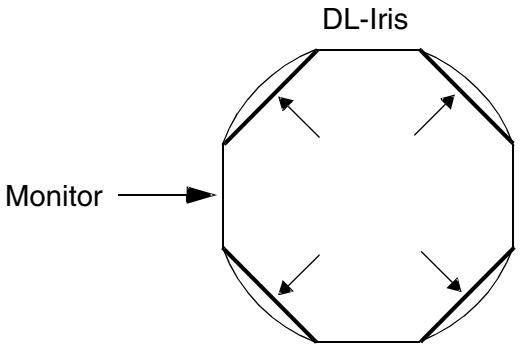


Fig. 8

- Move the unit to 0° position.
- Select zoom format 0 (full format).

- Open collimator fully.
- Switch SS "on".
- Release Fluoro.
- Check whether all collimator blades are visible and symmetrically adjusted (Fig. 8).
- Check the diagonal iris leaves for all zoom formats.
- Terminate Fluoro.

NOTE

The relevant tests required under the X-ray regulations of the relevant country (e. g. USA (DHHS), Germany (§16)..) must be performed.

NOTE

The collimator blades have to be slightly visible and symmetrical.

Symmetrical tolerance: 5 mm on the monitor (not depending on the monitor size).

Testing the KermaX (Option)

- Select zoom to full format (zoom 0).
- Start XCS SSW.
- Switch S3 on D100 to position "Service".
- Place the measurement chamber of DIADOS on the tabletop into the beam path.
  - DIADOS settings have to be as follows:
    1. Mode "Dose";
    2. Range "mGy";
    3. Filter "2.5 mm Al".
- Place the centering cross on the tabletop, centrally to the radiation field.

- With fluoroscopy switched on, collimate a field of approx. 20 cm x 20 cm.

  Make sure that the measurement chamber of DIADOS is fully illuminated.
- Calculate and record the area "A" (Tab. 3) of the collimated field on the monitor.

Area "A"	
Dose K_E	
Dose product ADP_a	
Dose product ADP_g	

Tab. 3

- Remove the centering cross.
- Switch off the I.I. voltage supply (fuse F10, Z108, in the generator cabinet).
- Reset the dose area product to "0" at the generator desk (see arrow, Fig. 9).

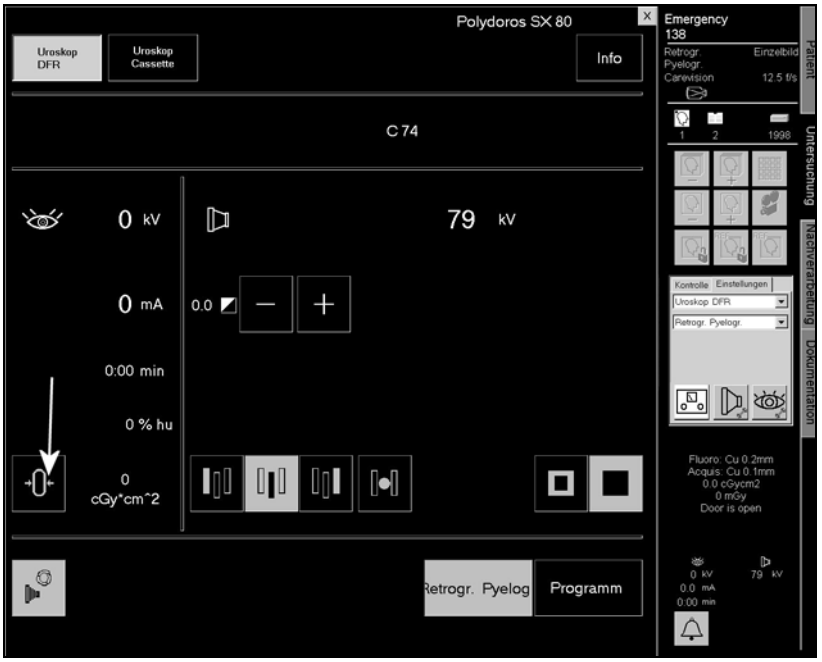


Fig. 9

- Select the "Components > Polydoros SX > Diagnostics > Nominal Power" menu in the XCS SSW.
- Select following parameters:
  - Large focus,
  - 70 kV,
  - Exposure-mAs: 20 mAs,
  - 2 Punkt Technique.

- Release DR.
- Read the incident dose K_E off the dose meter and record it (Tab. 3).
- Calculate the area dose product ADP_g from the formula $ADP_g = A \times K_E$.
- Read the area dose product ADP_a off the imaging system monitor (live monitor) and record it.
- Calculate the deviation from the following formula:

$$deviation\ (\%) = \left(\frac{ADPa\ -\ ADPg}{ADPg} x100 \right) \leq 30\%$$

The calculated value must be < 30 %.

- Terminate the XCS SSW menu and exit with "Cancel".

General

Switching off the FLUOROSPOT Compact

NOTE	**Normal condition - The application has been started and the system works correctly.**

NOTE	**If the system remains switched off for more than 10 seconds, the imaging system will also shut down. This takes approx. 3 minutes.**

Fault Condition

NOTE	**If the imaging system does not shut down after the system has been switched off at the tableside control panel, e.g. if the computer has crashed, it can be switched off by switching off the main voltage supply via the system contactor. If no system contactor is available, the PC must be switched off with the switch on the front of the PC.**

PDA and Dose Control

NOTE	**The following must be observed when performing measurements for image quality according document "Quality Assurance; IQAP":** **- If the light is switched on in the image distributor of the I. I. to determine the position of the PDA (D100.S1), this lamp is automatically switched off again after a few seconds. If switch S1 is not reset to normal, Fluoro will no longer function.** **- If there is a Diamentor chamber, this must be taken into account for indirect dose control (same measuring setup as for factory measurement).**

HIPAA Option

NOTE	**If the customer has the HIPAA option, you must identify yourself as the user at the FLC.** **Please register always as an emergency user during startup!**

Switching on the FLUOROSPOT Compact

- Switch the system on and wait for the boot routine to be finished.
- Create a new patient or an emergency patient.

- Select the "Examination" task card.
- Place an object, e. g. the precision X-ray filter, in the beam path.
- Acquire several DR test exposures to check the function.

Checks and Adjustments

NOTE **The following checks and adjustments are performed in FLC service mode.**

Keyboard Layout and Language

- Select "System" in the service menu bar (Fig. 1).

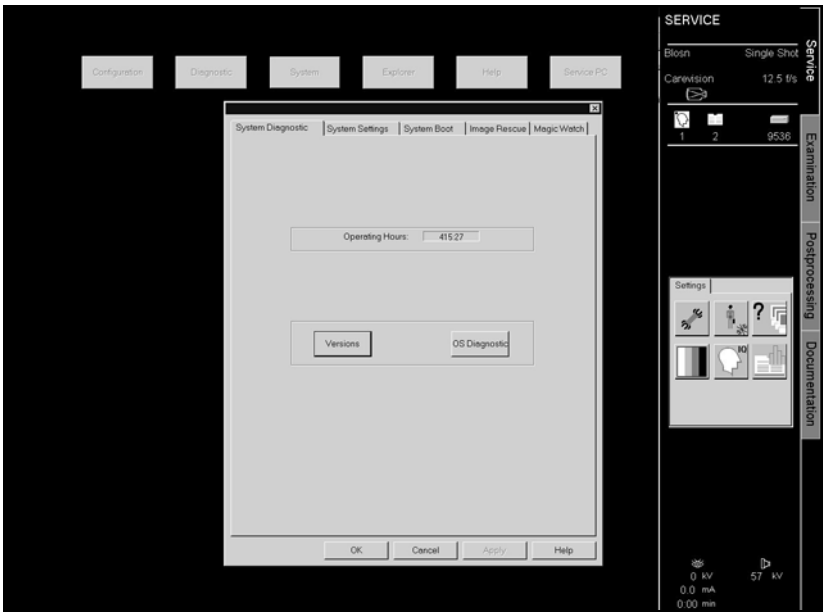


Fig. 1

- Select the task card "System Settings" (Fig. 2) and select the button "Control Panel".

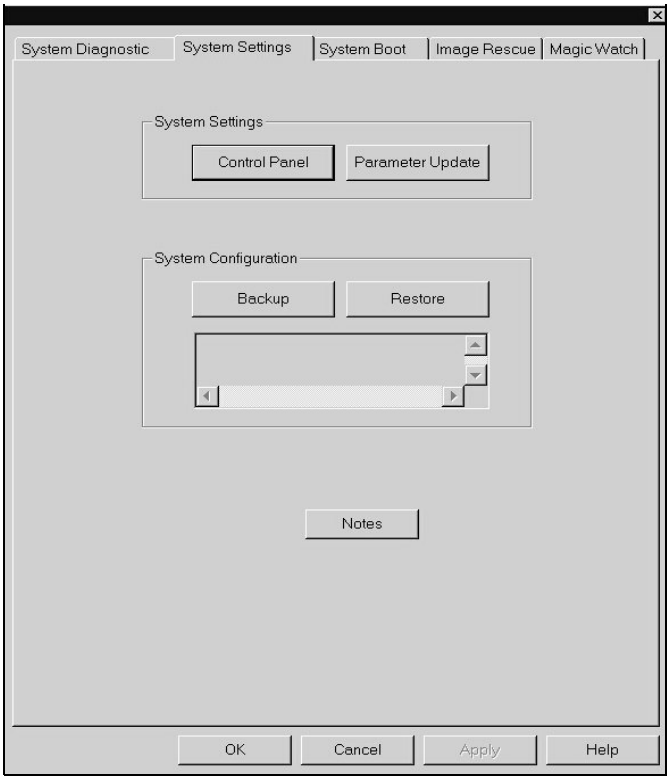


Fig. 2

The following window appears.

Fig. 3

- Select the "Regional Options" icon.

  The following window appears.

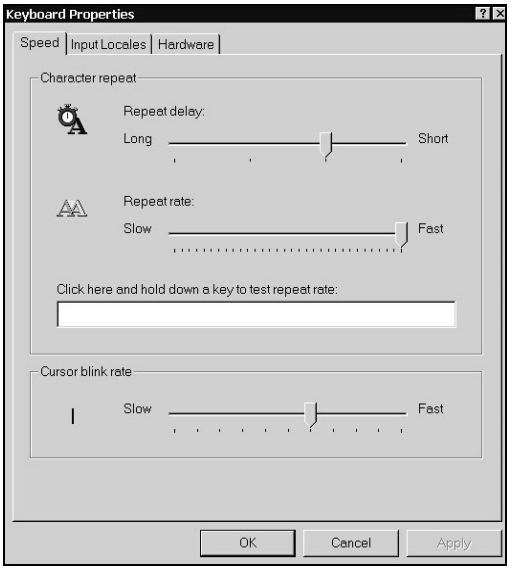


Fig. 4

- Select the task card "Input Locales".

  The following window appears.

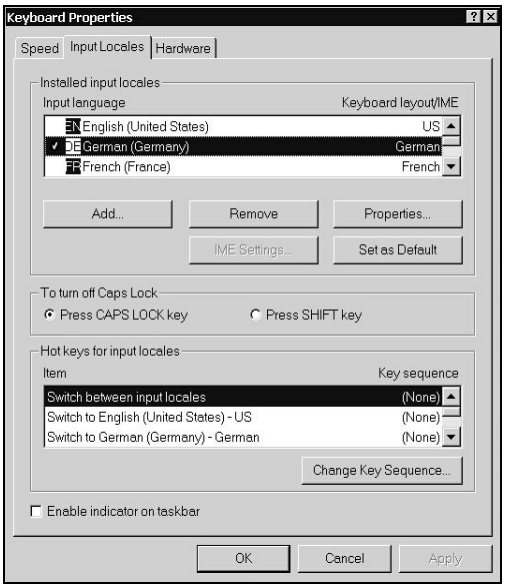


Fig. 5

- Choose the appropriate language under the "Input language" list box (Fig. 5), confirm with the button "Set as default" and close the window with "OK".

Image System Default Values

- Check the image system default values according document "Quality Assurance; IQAP" (chapter "Imaging System Startup", subchapter "Image System Default Values").

Options

- Check all options ordered by the customer to determine whether the license codes have been entered as follows.

- Select "Configuration" and subsequently "License" in the service main menu bar (Fig. 6).

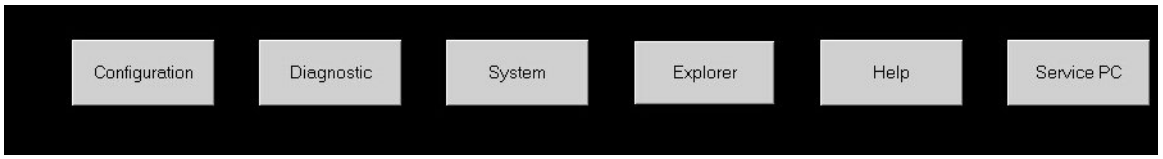


Fig. 6

- Select the affected options and check whether a license has been entered.

Checking Data in the XCU

Date and Time

The date and time are set in the XCU with the XCS-SSW.

- Start the XCS-SSW on your service laptop (Fig. 7).

  The following window appears.

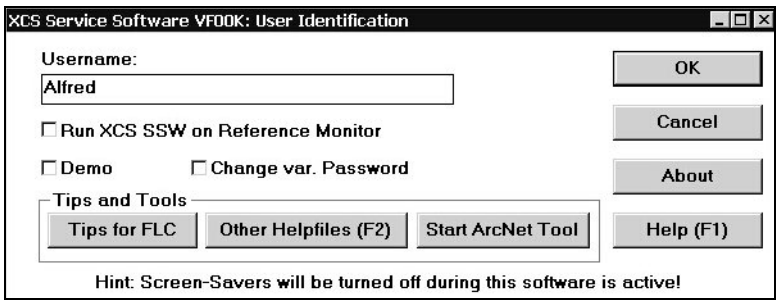


Fig. 7

- Confirm this window with the "OK" button.

  The following log-in window appears.

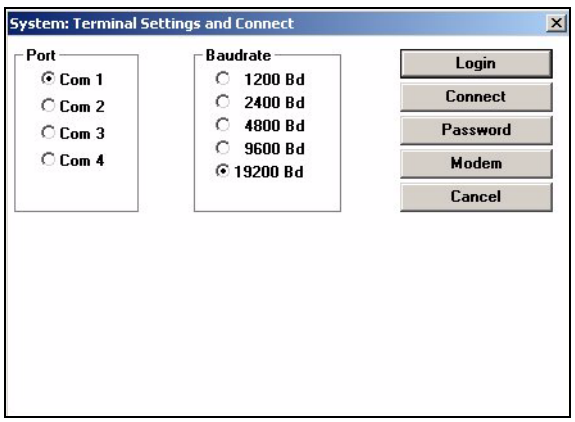


Fig. 8

- Log on to the XCS-SSW by pressing the "Login" button.

  The following window appears.

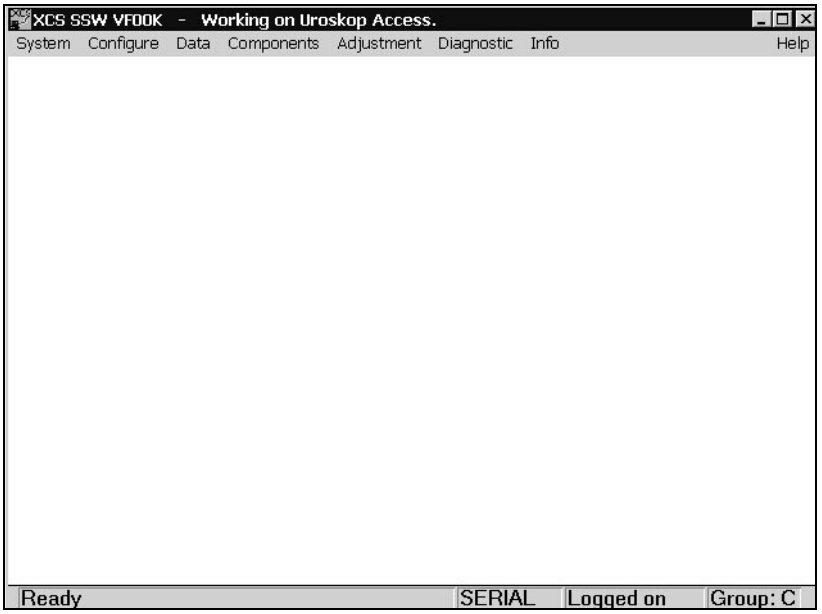


Fig. 9

- Select "System/Real time clock" (Fig. 10).

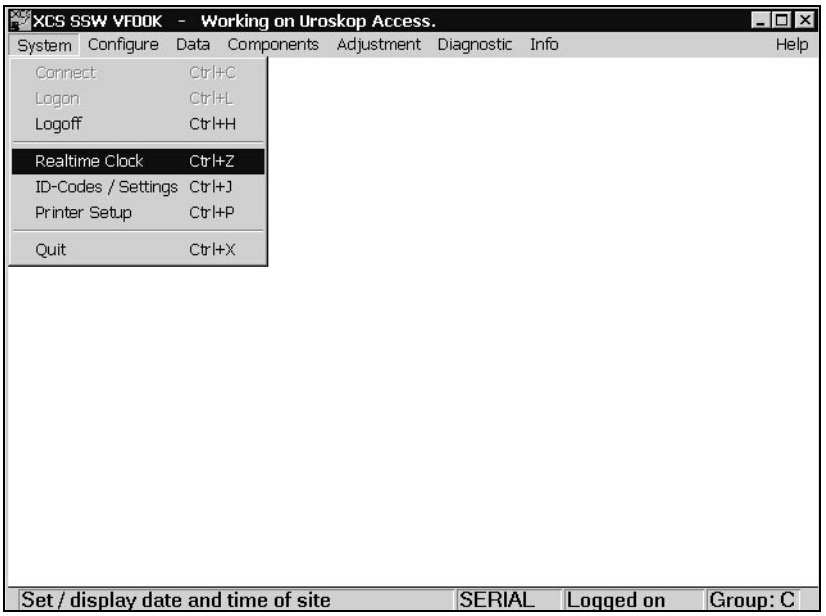


Fig. 10

The following window appears.

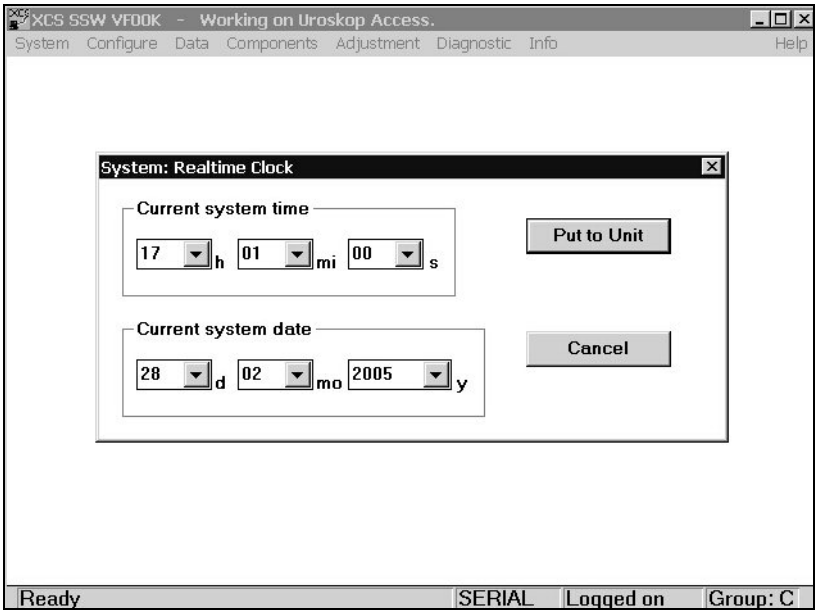


Fig. 11

- Check the current time and date and change if necessary.

NOTE **The summer/winter time correction is set in the FLC (see the User Manual).**

Customer Data

- Select "Customer Data" under the "Info" menu in the SSW home menu (Fig. 12).

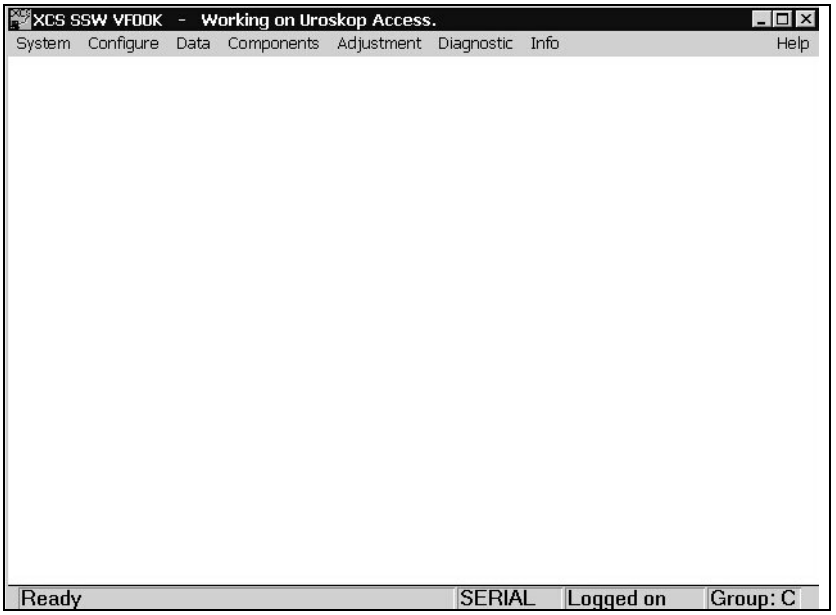


Fig. 12

The following window appears.

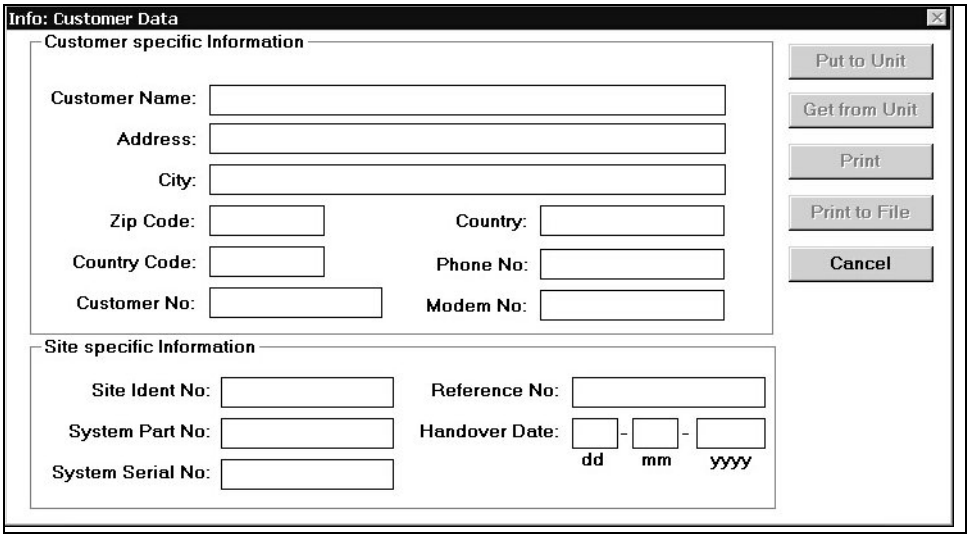


Fig. 13

- Fill in all boxes in the window and additionally in Tab. 2, otherwise the storage of these data will not take place.

NOTE	**Be very careful when filling in the numerical boxes so that the logs will be correctly allocated in the SRS server.**

NOTE	**The following system serial no. (Tab. 2) may not contain characters other than the numbers 0 through 9.** **It never begins with 0.**

NOTE	**The label with the system serial number at the base of the system must indicate the model no. 57 56 122 or 57 56 130 (Fig. 15).**

The serial number is located at the base of the system (Fig. 14).

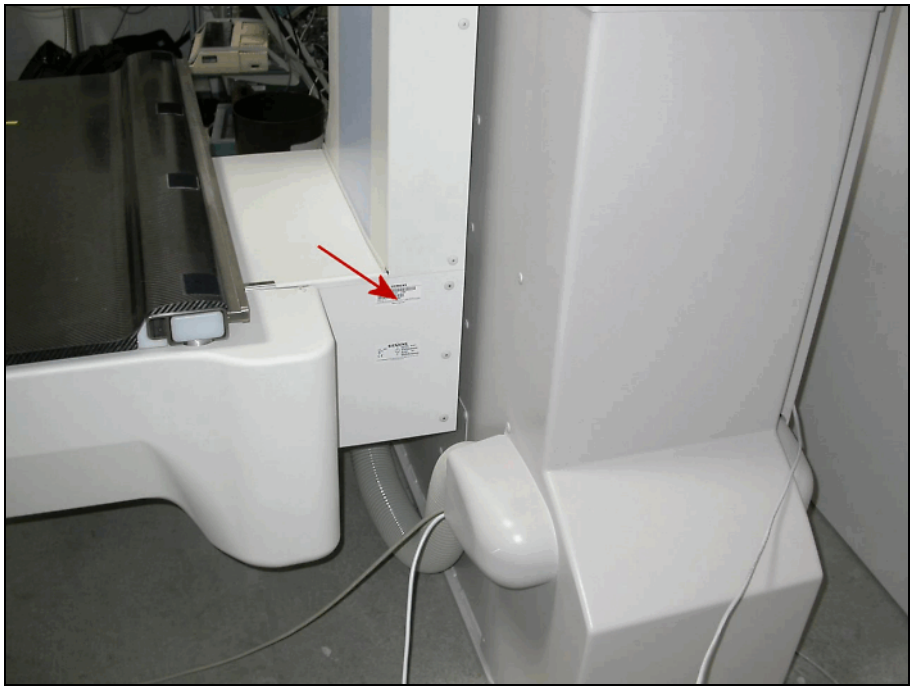


Fig. 14

Fig. 15

Customer-specific information	**Data**
Customer name	Hospital name

Tab. 1 Customer specific data XCU (Hints)

Customer-specific information	Data
Address	Street
City	Hospital location
Zip code	Zip code
Customer no.	max. 15 characters (This number is assigned by the country service organization.)
Country	Country
Phone no.q	Room or department phone no.
Modem no.	enter "n. a."
Site ident. no.	System no. (This number is assigned by the country service organization.)
System part no.	Please enter the appropriate part no. (57 56 130 or 57 56 122)
System serial no.	Please enter the system serial number. (This number is labeled at the basic unit and belongs to mat. no. either 57 56 122 or 57 56 130.)
Reference no.	enter "n. a."
Handover data	Date on which the system was started up, e. g. 09/2005

Tab. 1 Customer specific data XCU (Hints)

Customer-specific information	Data
Customer name	
Address	
City	
Zip code	
Customer no.	
Country	
Phone no.	
Modem no.	n. a.
Site ident. no.	
System part no.	
System serial no.	
Reference no.	n. a.
Handover data	

Tab. 2 Customer specific data XCU - site data

- Save the entered data using the button "Put to unit" (Fig. 13).

Checking the Options

- Check the function of all options ordered per the order.

Image Quality Tests

The document "Quality Assurance; IQAP" is located in the system binder.

Required IQ Tests

NOTE	**The image quality tests which have to be performed during startup are described in document "Quality Assurance; IQAP" and are MARKED with the "D".**

Hardcopy Camera

For connection and adjustment, see documentation "General Hardcopy Camera Information" and "Specific Hardcopy Camera Information" for the concerned type of camera.

Perform the tests required in the document "Quality Assurance; IQAP" for the hardcopy camera and record the results in this document.

Auto Shutter

It is possible to activate the electronic "auto shutter" in the FLC organ programs. Following a DR exposure, the auto shutter moves automatically over the collimator plates shown on the monitor. The amount of this over-collimation can be changed in the FLC using a correction value.

This setting should be made in discussion with the customer.

Check

- Create a single image organ program with selected "Bones, white" and activate the "auto shutter" in the organ program.
- Place the 2.1 mm Cu precision X-ray filter in front of the collimator.
- Move the unit into the +45° position and select I. I. full format (zoom 0).

- Release the DR.
- Close the collimator under fluoroscopy so that the horizontal and vertical collimator plates are visible on the monitor.
- Release DR exposure.
- Evaluate the over-collimation of the electronic shutter on the monitor.

  It should cover the white edges of the collimator plates.
- Select all configured I. I. formats and check the shutter position.

Correction

- Select the "Settings" subtask card from the patient list.
- Select the button "Customer settings".

NOTE **In the "User Settings" window, the offset values for the width shutter (delta X) and the height shutter (delta Y) can be entered in the bottom right of the image area.**

The adjustment range is 0 to +100. Ten points change correspond to approx. 1 mm more closure of the electronic shutter on the monitor. The affect of the correction values on shutter display on the monitor is always equal and does not change with selection of another I. I. format.

- Release additional DR exposures in the acquisition mode after each change of the offset values.
- Change the offset values until the desired result has been achieved.
- Perform a check of the shutter position for all I. I. formats.
- Perform the check for the 0° and 90° position also.

NOTE **It is possible that the correction will not be sufficient for all I. I. formats or unit positions (drift of central beam). Changing the correction values from 0 to 100 results in a reduction of the shutter opening of approx. 10 mm.**

In this case, the shutter has to be corrected manually in the saved image.

Installing Help Files

NOTE **With the FLC version VD46A the "FLC Online Help for UROSKOP Access" as well as the "Online System Help" has been installed in factory.**

These CD-ROM's are located in the system binder.

Installation Check

- Select "Home" in the FLC service main menu to start the "FLC Online Help for Uroskop Access".
- Close the "FLC Online Help" window.
- Press "F1" while the patient list is selected.

  The "Online System Help" window will appear.
- Close the "Online System Help" window.

NOTE

The installation of both, "FLC Online Help for Uroskop Access" and "Online System Help", is only necessary in cases if it has not been installed in factory.

The installation process is described below.

FLC Online Help for Uroskop Access

- Select "System" in the service menu bar.

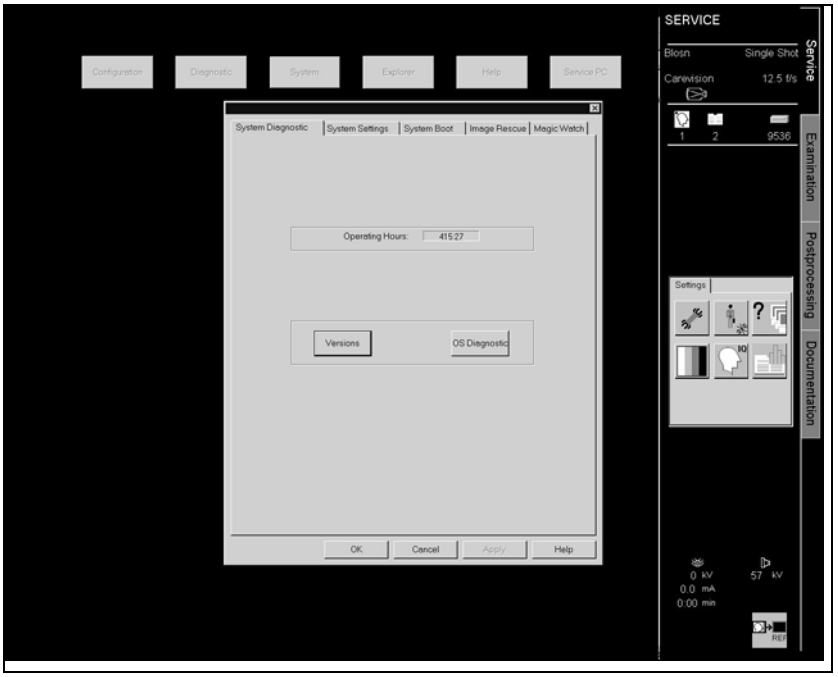


Fig. 16

- Select the subtask card "System settings" (Fig. 16).
- Insert the CD-ROM "FLC Online Help for UROSKOP Access" into the drive and wait for the LED to go on without blinking.
- Select the button "Parameter update".

  A command window will appear. Increase the window size and follow the instructions on the monitor.

- After the installation routine has been finished, remove the CD from the drive and file it again in the system binder.

Online System Help

- Insert the CD "Online System Help" into the drive and wait until the green LED goes on without blinking.
- Select the button "Parameter update".

  A command window will appear. Increase the window size and follow the instructions on the monitor.

- After the installation routine has been finished, remove the CD from the drive and file it again in the system binder.

Final Work Steps

Function Check

- Create a test patient and acquire several images.

Backup of Configuration

- Save the current configuration on a CD-ROM according to the "FLC Online Help for UROSKOP Access" (menu "Configuration").
- Delete test folders that are not longer needed from the patient list.

HIPAA Option

- If the HIPAA option is configured, the customer’s network administrator must be informed so that he can set up the HIPAA users and groups and to make a backup of them (workflow described in the User Manual).

Definition of Terms for Cassettes

The terms "Length" and "Width" that are used are defined in the following sketch.

The position of the cassette to the tabletop is defined by the manner in which the cassette format is written.

NOTE	The first number always defines the "Width".

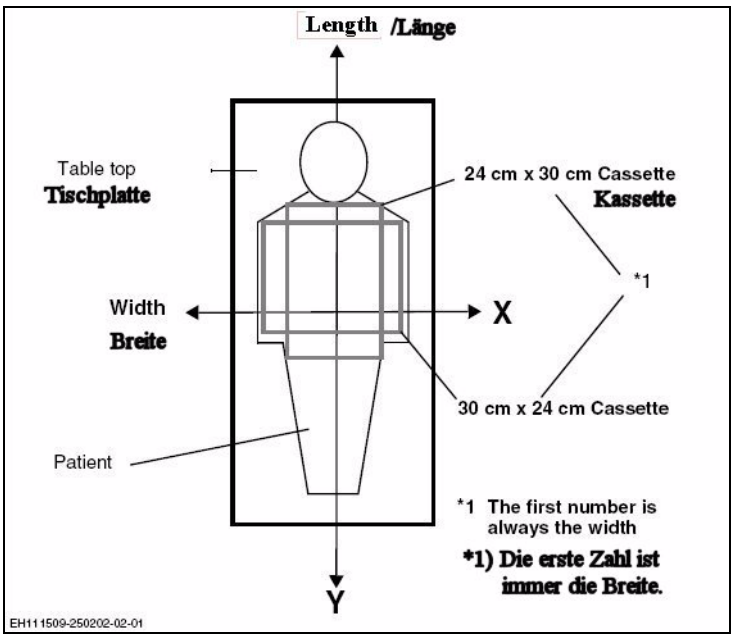


Fig. 1 Terms for Cassettes

Testing the Cassette (Option)

NOTE	To ensure that the settings have not changed during system transport, test exposures must be taken and compared with the radiographs supplied. If these test exposures coincide with the radiographs supplied by the factory or are within the specified tolerances, the factory settings should not be changed.

NOTE	This check is DHHS relevant.

Coincidence of Radiation Field Center and Film Center

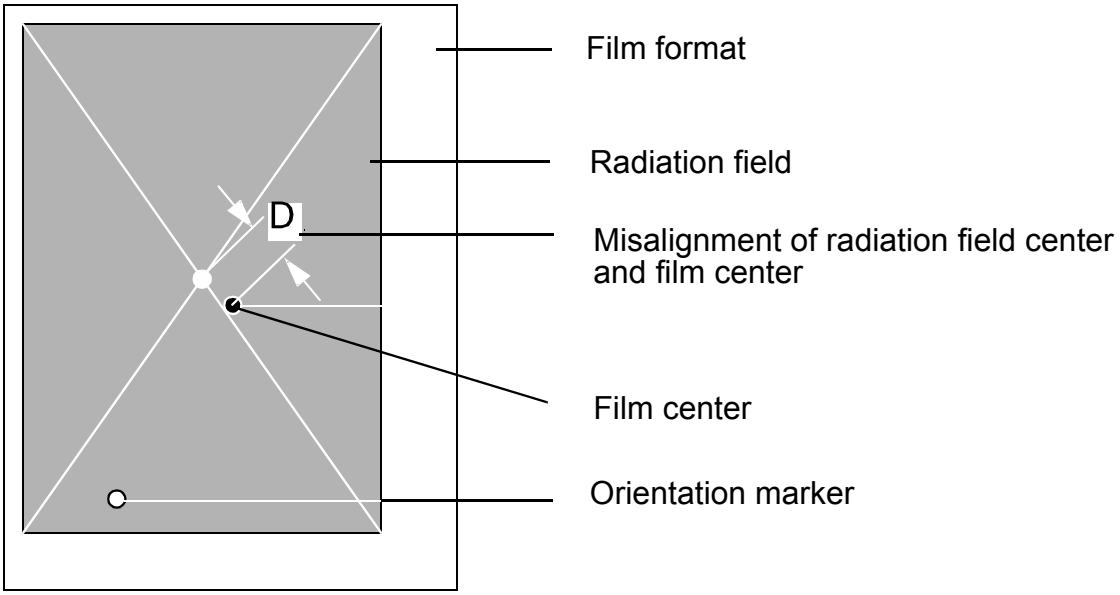


Fig. 2 Coincidence of Radiation Field Center/Film Center

- Move the unit into 0° position.
- Move the tube assembly and I.I. in the exposure position.
- Remove all Cu filters (if inserted in collimator).
- Select the "Examination" task card and select "Uroskop Cassette", "70 kV" and "320 mAs" in the list box (Fig. 3) of the "Settings" sub task card.

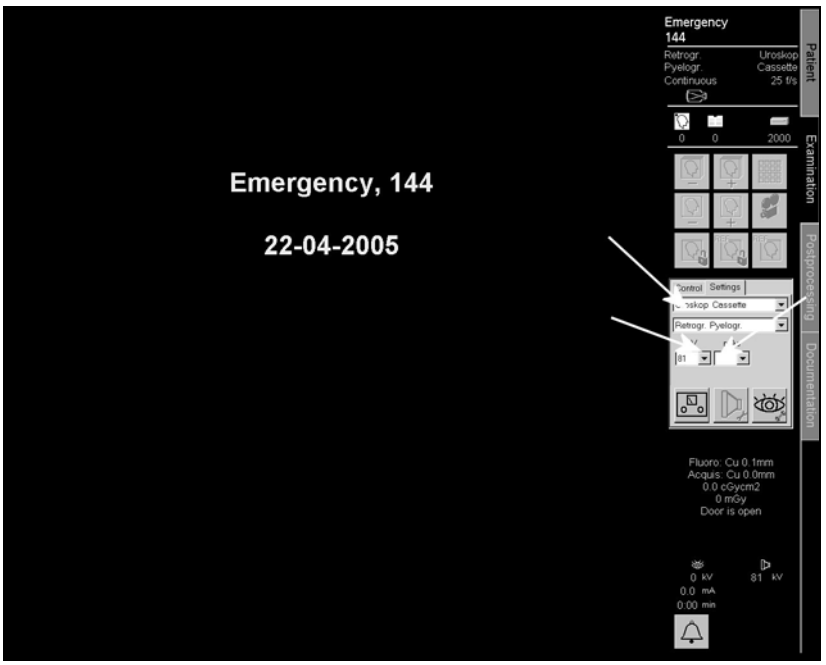


Fig. 3

- Place a cassette with a center and side marker with film/without screen into the cassette tray.
  - The side marker should be located approx. 3 cm below the center diagonally.

- Release an exposure in following positions for each case according to Tab. 1.

.

0° position	approx. 10 cm x 10 cm collimation
+90° position	approx. 15 cm x 15 cm collimation
-90° position	approx. 20 cm x 20 cm collimation

Tab. 1 Collimation

- Develop the film and note the exposure date/data on it.

Evaluation

- Mark the radiation field center for all 3 collimations on the developed film and determine the distance Z to the film center (center deviation).
- Max. permissible deviation:

  - For 10 cm x 10 cm collimation: center deviation $Z \leq 7$ mm

  - For 15 cm x 15 cm/20 cm x 20 cm collimation

$$\text{Centerdeviation}(\%) = \frac{Z}{115\text{cm}} \times 100 \leq 1,2$$

Coincidence of Light Field and Radiation Field

- Move the unit into 0° position.
- Move the tube assembly and I.I. in the exposure position.
- Remove the patient pad, if placed on tabletop.
- Manually select a format of 25 cm x 25 cm at the collimator.
- Switch on the light localizer and place the centering cross centrically to the collimated field.
- Mark the edges of the light field with radiation attenuating material, see Fig. 4.

- Release exposure and develop the film.

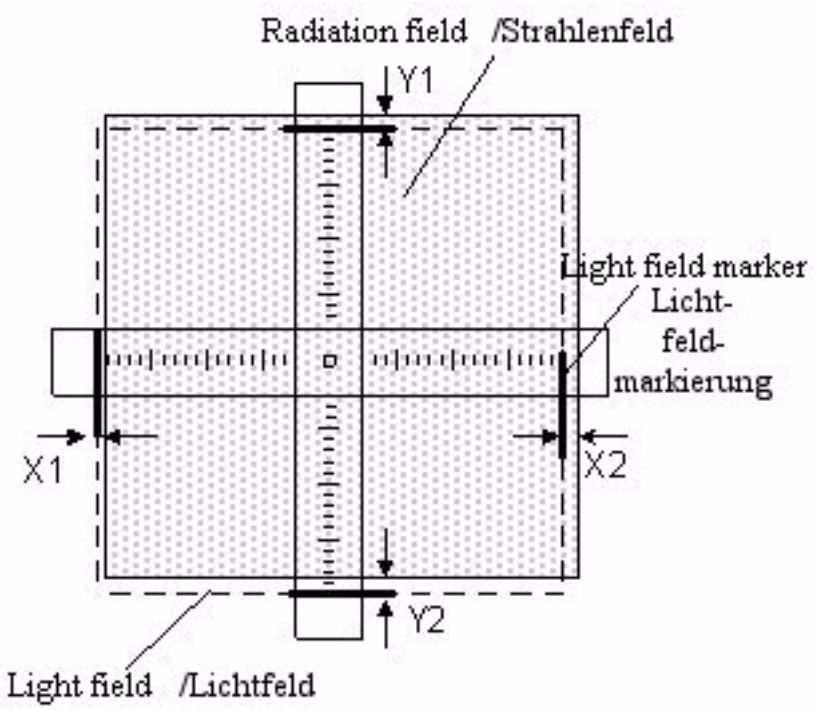


Fig. 4 Coincidence of light field/radiation field

- Measure the deviations between light field edges and radiation field edges on all four sides (X1, X2, Y1, Y2) of the film by the help of the centering cross and note it.

$$\sum X(\%) = \left(\frac{X1 + X2}{108\,\mathrm{cm}}\right) \times 100 \leq 1,2\%$$

$$\sum Y(\%) = \left(\frac{Y1 + Y2}{108\,\mathrm{cm}}\right) \times 100 \leq 1,2\%$$

NOTE	**Distance focus-tabletop = 108 cm**

Film/Screen Combinations used

- At the imaging system only one exposure stage (BSt) out of the three available for selection (H, U or D) can be programmed.
- Record the film intended for the screen used with the following data from the manufacturer in the "Test certificate UROSKOP Access":
  - Speed S;

- Theoretical dose requirement K_S;
- Minimum resolution R_{Gr};
- Color sensitivity of films and screens.

- Make sure that you use only films which are sensitized for the light color emitted by the screen (green sensitive film for screen emitting green color, blue sensitive film for screen emitting blue color).

NOTE There are no standard international regulations regarding the use of film/screen combinations; the national regulations (e. g. §16 RöV) must be complied with.

Storage Phosphor System

In the case of customer documentation with a storage phosphor system, adjustment must be made together with the engineer from the manufacturer of the imaging plates.

Speed S

- Record the sensitivity S (Speed) stated by the manufacturer for the film/screen combination.
- In general (legal requirement in some countries) the S value is indicated on the cassette (e. g. S = 200) or in the data sheets of the film/screen combinations.
- According to ISO 9236, the speed of a film/screen combination is defined as the quotient of 1000 µGy and the air kerma (dose) K_S required to obtain an optical density (blackness) of 1 above fog.

$$S = \frac{1000}{K_S}\mu Gy$$

Dose Requirement K_S

- If the speed S is known, the theoretical dose requirement K_S must be determined and recorded.

$$K_S = \frac{1000}{S}\mu Gy$$

Minimum Resolution R_{Gr}

NOTE

Each dose requirement K_S is assigned a minimum resolution R_{Gr} in LP/mm; i. e. the higher the dose requirement of a film/screen combination, the higher the resolution obtainable with this dose must be so that the increased dose is justified.

- Take the relevant minimum resolution R_{Gr} from the diagram (Fig. 5) for the film/screen combination used and record it.

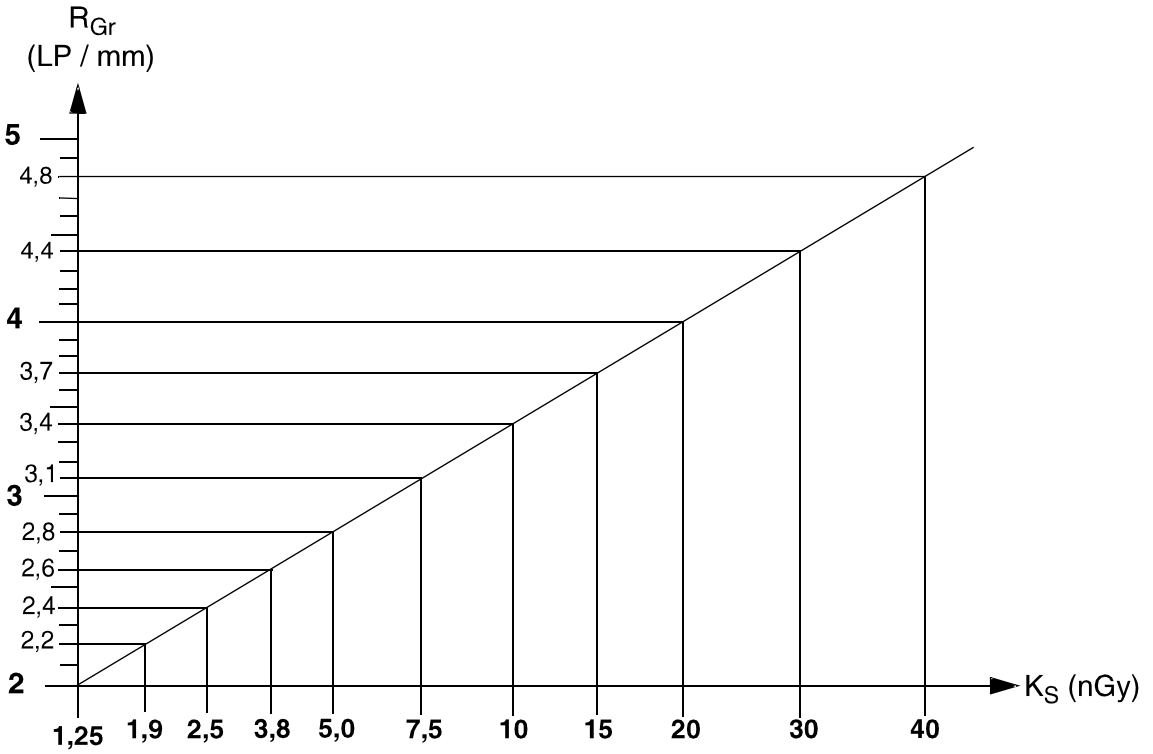


Fig. 5 Minimum resolution - dose requirement

K_S = dose requirement of the film/screen combination acc. to DIN 6867

R_{Gr} = minimum resolution of the film/screen combination acc. to DIN 6868

NOTE

Only one screen type can be programmed in the imaging system configuration. The factory setting is type U.

IONTOMAT Sensitivity

- Register a test patient at the imaging system and select "Uroskop Cassette" in the "Settings" sub task card in the "Examination" mode.
- Place a 20 cm ± 1 cm (5 cm ± 1 cm) water phantom in the beam path.
- Collimate to the water phantom.

- Choose the following exposure parameters at the generator desk:
  - 81 kV;
  - 80%;
  - small focus;
  - exposure stage, e.g. "U", (factory setting);
  - middle Iontomat dominant.
- Start the XCS SSW.
- Select "Components/ Polydoros SX/ Adjustment/ Iontomat Sensitivity" in the XCS SSW.
  - Select the IONTOMAT chamber.
  - Check/enter the sensitivity value for exposure stage, e.g. "U", corresponding to the film/screen combination used.

Recommended Values for the Basic Setting

- The following values apply to the menu item "Iontomat channel A 6mm".

Screen	Sensitivity
(H) 400	12
(U) 200	15 (factory setting)
(D) 100	18
Lead	0.0

NOTE **With the "Transfer Value" function, the data in the XCU can be updated and test exposures can be taken without exiting the SSW.**

- The settings for "Iontomat Chnl. F-SDM" are as follows.

Screen	Sensitivity
(H) 400	-
(U) 200	-
(D) 100	-
Lead	1.3

Setting with 20 cm water phantom

- Take test exposures with a 20 cm $\pm$ 1 cm water phantom (film format $\geq$ 35 cm x 43 cm) for all screens and check the film density.
  - The films must have the optical density required by the customer.
  - If no specific density is required, set the net optical density $D_N = 1$ (density 1.0 + fog).
  - If required, correct the sensitivity value for the screen type used H, U or D.
- Enter the configured values and measured values into the "Test certificate UROSKOP Access".

Setting with 5 cm water phantom

- Select the exposure stage, e.g. "U".

- Take test exposure with 5 cm ± 1 cm water phantom.
- Set the net optical density for the 5 cm water phantom to the same value as for the 20 cm water phantom.

  With the 5 cm water phantom the density is set using the "Lead" function in the "IONTOMAT Sensitivity" window.

The "Lead" setting applies for all three exposure stages H, U or D.

- Exit the window with "OK".

IONTOMAT Voltage Response Correction

- Register a test patient at the imaging system and select "Uroskop Cassette" in the "Settings" sub task card in the "Examination" mode.
- Place a 20 cm ± 1 cm water phantom in the beam path.
- Collimate to the water phantom.
- Use following exposure parameters:

60 kV	80%	small focus	e.g. exposure stage U	middle Iontomat dominant
125 kV	80%	small focus	e.g. exposure stage U	middle Iontomat dominant

Tab. 2

- Select "Components/Polydoros SX/ Adjustment/Voltage Response Correction" in the XCS SSW.
  - Determine and enter the correction curves H, U or D corresponding to the configured film/screen combination.

Value ranges:	< 81 kV: 0...13
	≥ 81 kV: -13...0

Tab. 3

NOTE

With the "Transfer Value" function the data in the XCU can be updated and test exposures can be taken without exiting the SSW.

- For the screen used take test exposures at 60 kV and 125 kV with 20 cm ± 1 cm water and check the film density in each case.
  - The film density at 60 kV and 125 kV must correspond to the film density at 81 kV (see subchapter "IONTOMAT Sensitivity").

- The deviation in density may be:

  D_{opt} (81 kV) - D_{opt} (60 kV) $\leq$ 0.2
  D_{opt} (81 kV) - D_{opt} (125 kV) $\leq$ 0.2

  of the optical density.
- If necessary, select different correction curves for the lower or upper kV range.

- Exit the SSW mask with "OK".
- The following graph (Fig. 6) and the associated table of values show the correction curves 1...13 for the lower kV range (40 kV...81 kV) and the correction curves -13...-1 for the upper kV range (81 kV...150 kV).

  Here you can check the change in exposure points and density resulting from changing to a different correction curve for specific kV values.

NOTE	**A change by 1 exposure point results in a change in density of approx. Δ S = 0.25.**

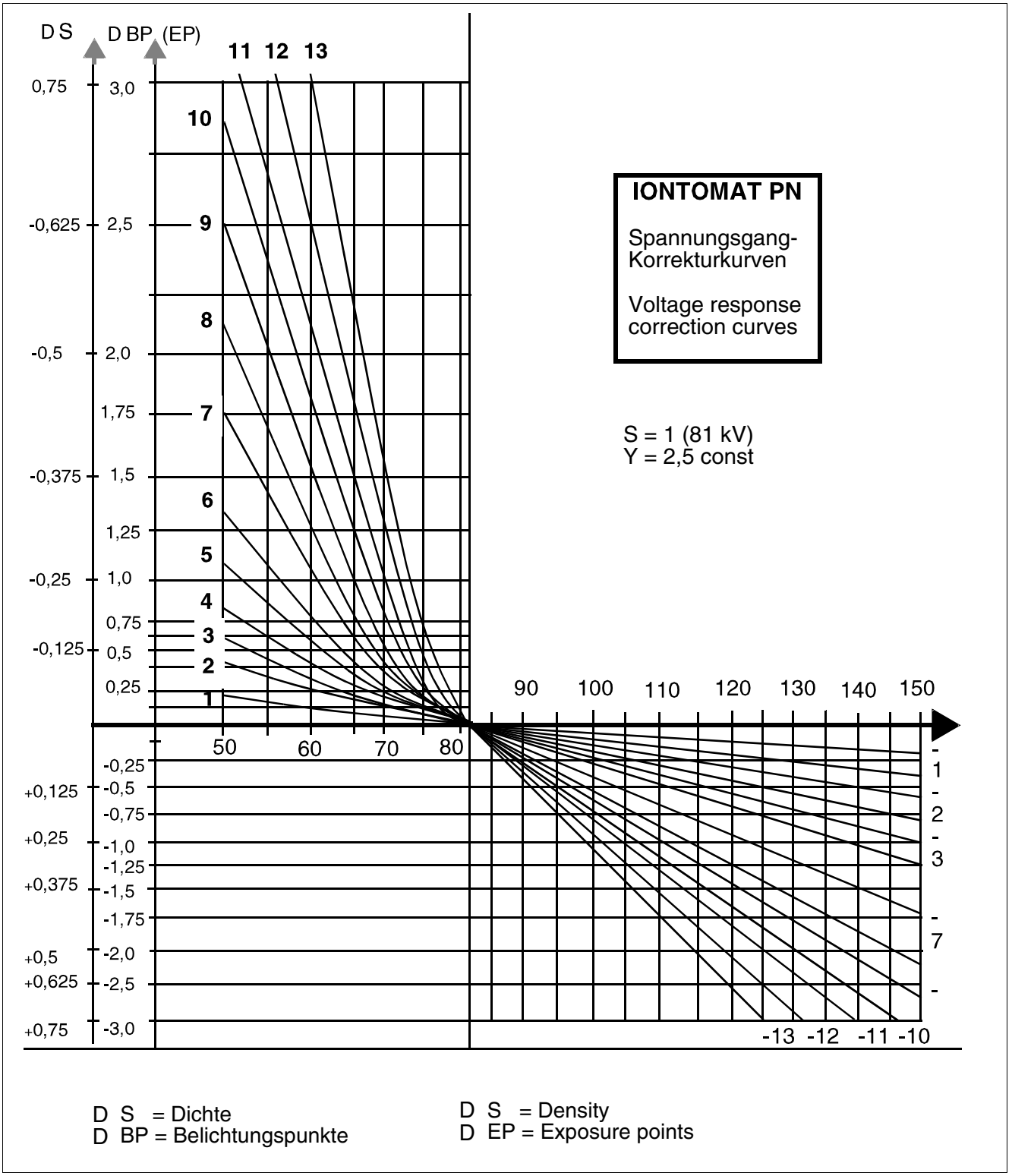


Fig. 6 Voltage Response Correction Curves

(≤ 81 kV)	Corrections for the lower kV range (≤ 81 kV)												
kV	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
40	48	42	35	32	28	24	20	16	13	11	8	6	3
41	47	41	34	31	27	23	19	15	13	10	8	6	3
42	46	40	33	30	26	23	19	15	12	10	8	5	3
44	44	38	31	28	25	21	17	13	11	9	7	5	2
46	41	35	30	26	23	20	16	12	10	8	7	4	2
48	39	33	28	25	22	18	15	11	10	8	6	4	2
50	37	31	26	23	20	17	14	10	9	7	5	4	2
52	34	29	24	21	18	15	13	9	8	6	5	3	2
55	30	26	21	18	16	13	11	8	7	6	4	3	1
57	28	23	19	17	14	12	9	7	6	5	3	2	1
60	24	20	16	14	12	10	8	6	5	4	3	2	1
63	20	17	13	11	10	8	6	5	4	3	2	2	1
66	16	13	10	9	8	6	5	4	3	2	2	1	1
70	11	9	7	6	5	4	3	3	2	2	1	1	0
73	8	6	5	4	3	3	2	2	1	1	1	0	0
77	3	3	2	2	2	1	1	1	1	0	0	0	0
81	0	0	0	0	0	0	0	0	0	0	0	0	0
85	-2	-1	-1	-1	-1	-1	-1	-1	0	0	0	0	0
90	-4	-3	-3	-2	-2	-2	-1	-1	-1	-1	-1	0	0
96	-7	-6	-6	-4	-4	-3	-3	-2	-2	-1	-1	-1	0
102	-10	-8	-8	-6	-5	-4	-4	-3	-2	-2	-1	-1	0
109	-13	-11	-11	-9	-7	-6	-5	-4	-3	-2	-1	-1	-1
117	-18	-15	-15	-11	-10	-8	-6	-5	-4	-3	-2	-2	-1
125	-24	-20	-20	-14	-12	-10	-8	-6	-5	-4	-3	-2	-1
133	-31	-25	-25	-17	-15	-12	-10	-7	-6	-5	-4	-2	-1
141	-40	-32	-32	-21	-18	-15	-11	-8	-7	-6	-4	-3	-1
150	-53	-40	-40	-26	-21	-17	-14	-10	-8	-7	-5	-3	-2
kV	**-13**	**-12**	**-11**	**-10**	**-9**	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**
(> 81 kV)	**Corrections for the upper kV range (> 81 kV)**												

BP = exposure points

In the table Δ BP are indicated as 1/8 BP.

Cutoff Dose and Resolution

NOTE

The values are recorded in the "Test certificate UROSKOP Access". They can then be copied for the acceptance test according to §16 RöV.

Measuring Conditions

- Register a test patient at the imaging system and select "Uroskop Cassette" in the "Settings" sub task card in the "Examination" mode.

- Choose the density correction to "± 0" exposure points in the XCS SSW.
- No additional filters are selected at the collimator.
- Remove the table pad.

Test phantoms

Area of applicability of §16 RöV	Other countries
Place a 25 mm Al test phantom (measuring system) on the tabletop into the beam path.	Place a 2.1 mm Cu filter on the collimator.

- Choose following exposure parameters:
  - 77 kV;
  - small focus;
  - 80%;
  - center Iontomat measuring field.

- Release exposure.
- Record the kV value in the "Test certificate UROSKOP Access".

Procedure (with DIADOS)

- Place the dose detector on the tabletop outside the center Iontomat measuring field.
- Set the filter to 23.5 mm/27.5 mm Al (depending on the DIADOS version) at the DIADOS detector.
- Place the resolution test, type 42, on the tabletop at 45° to the patient axis outside the center Iontomat measuring field.

- Perform the following measurements for the exposure stage H, U or D :
  - Measure the cutoff dose K_T.
  - Develop the film and measure the optical density D (with fog).
- Determine the resolution R_g of the film.

.

$$K_B = \frac{K_T \cdot f_K}{m}$$

Fig. 7 Cutoff dose in the image receptor plane

K_T	Cutoff dose measured on the table
K_B	Cutoff dose in the image receptor plane
m	Unit attenuation factor without cassette = 2, with cassette = 2.2
f_K = 1,0	Correction factor for DIADOS detector

- Calculate the cutoff dose K_B.

Resolution Rg

- For each film/screen combination R_G must be $\geq R_{Gr}$ (subchapter "Minimum Resolution R_{Gr}").

.

NOTE	**If the minimum resolution R_{Gr} is not achieved, check the screen for damage and contamination and the cassette for correct attachment of the screen.**

- Record all values determined into the "Test certificate UROSKOP Access".

Function of the Measuring Fields (Difference of Dominants)

- Register a test patient at the imaging system and select "Uroskop Cassette" in the "Settings" sub task card in the "Examination" mode.
- Set density correction to "$\pm$ 0" exposure points in the XCS SSW.
- No additional filters are selected at the collimator.
- Insert the cassette with screens corresponding to the set exposure stage, e.g. U.

Test Phantoms

Area of applicability of §16 RöV	Other countries
Place a 25 mm Al test phantom (measuring system) on the tabletop into the beam path.	Place a 2.1 mm Cu filter on the collimator.

- Choose following exposure parameters:
  - 77 kV;
  - small focus;
  - 80%.

- Release DR.
- Determine the optical density of the films and calculate the differences in density.

  $\Delta D_{\text{left measuring field}} = | D_{\text{center measuring field}} - D_{\text{left measuring field}} |$

  $\Delta D_{\text{right measuring field}} = | D_{\text{center measuring field}} - D_{\text{right measuring field}} |$

Tolerance: $\Delta D \leq 0.3$

- Record the values in the "Test certificate UROSKOP Access".

Drift and Hum Voltage of the Iontomat Chamber

NOTE	**The generator must have been switched on for at least 5 minutes before the test is performed.**

Checking the Drift

- Connect the oscilloscope to following connecting points:

CH1: D100.X63.VION and D100.X63.AGND
Trigger: D100.X64.SWR

NOTE	**If a digital oscilloscope is used, the measurement must not be made in the "Glitch Detect Mode" (averaging, smoothing), since this can result in incorrect measuring results.**

- Switch off the I.I. voltage supply (fuse F10 at board Z108 in generator).
- Cover the collimator with sufficient lead.
- Load a blank 35 cm x 43 cm cassette.
- Close the collimator.

NOTE	**The collimator must be closed again each time a cassette has been inserted.**

- Switch the SS switch on the D100 board "on" and switch S3 to position "Service".
- Start the XCS SSW.
- Select the menu "Components /Polydoros SX /Diagnostic/Iontomat Drift" in the XCS SSW.

- Select the center measuring field and measure the drift according to the instructions in the SSW.

Maximum drift: 0 ± 2 V/0.5 s (with SS switch in position "on"; Example 2, 3 in Fig. 8)

NOTE	**With SS switch in position "off", you have a maximum drift of 0 ± 1 V/0.5 s (Example 1, Fig. 8).**

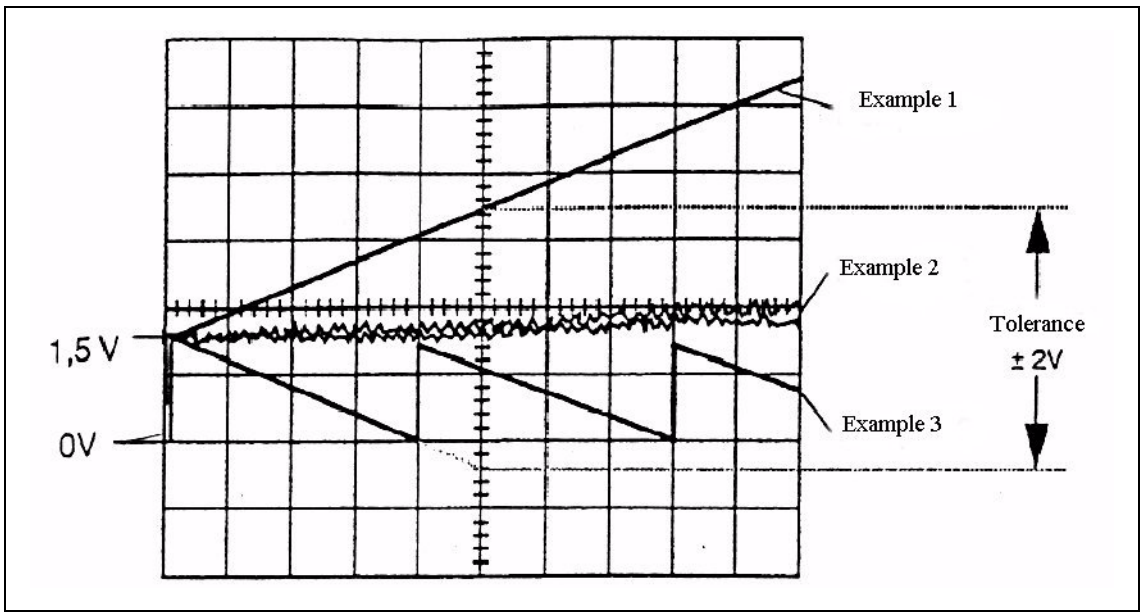


Fig. 8 Oscillogram

[1 V/Div; 0.1 s/Div (Fig. 8)]

NOTE **If the drift is too large, check if the lead cover is sufficient.**

- Close the window with "OK" and exit the XCS SSW.
- Remove the lead at the collimator and switch the I.I. voltage supply back on.

Checking the Hum Voltage

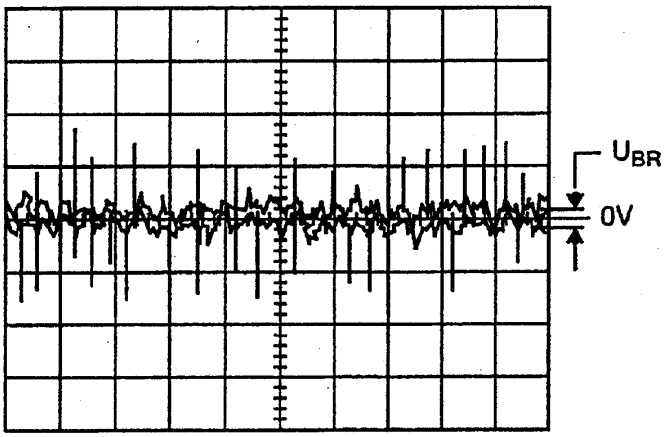
- Connect the oscilloscope to following connecting points:

CH1: D100.X63.DLIN and D100.X63.AGND
Trigger: D100.X64.SWR

- Switch "S3" to "normal" position.
- Switch SS switch to "off" position.
- Select all measuring fields in sequence and measure the hum voltage for each measuring field during the exposure.

Max. permissible hum voltage $\leq 20\ mV_{ss}$

NOTE **Make sure that the cassette is moved in completely during each measurement.**



Oscillogram 2:
Hum voltage at
D100.X63.DLIN

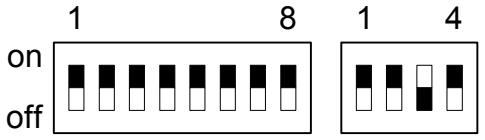
10 mV/DIV

10 ms/DIV

Data Printer (Option)

NOTE	**The data printer type Star DP8340S must be used.**

- Program the DIP switches as follows:



- Connect the data printer to the voltage supply.
- Connect a serial interface cable to the printer and to the XCU.X62 (top).
- Insert an ink ribbon into the printer (see printer description).
- Insert paper and switch the printer on.
- Release radiation under DR.

NOTE	**The printer is activated automatically at the end of the exposure / exposure series**.

.

NOTE	**Note that the area dose product is printed out for each individual exposure or exposure series whereas on the monitor the total area dose product is displayed.**

- Check if the labels are printed in the vertical direction and in the center.

Fluoroscopy

Programming and Documenting Customer-specific Fluoroscopy Values

NOTE

The tests and measurements performed so far were carried out to ensure that the system is working properly from a technical point of view.
To satisfy the user it may be necessary to adapt the system to its specific medical use and procedures on site.

Note relating to the Acceptance Test according to §16

- Use a prefiltration of 25 mm Al + 1.5 mm Cu.
- The dose rate values measured with 25 mm Al + 1.5 mm Cu correspond to the values resulting with 2.1 mm Cu. However, the kV and mA values resulting from these settings are different.

Maximum Fluoroscopic Time

- Observe the country-specific regulations regarding the max. fluoroscopic time.

  The factory setting is as follows:

	Fluoroscopy alarm	Fluoroscopy blocking
Canada/ USA	5 min.	n.a.
Europe/ROW	5 min.	10 min.

- If the fluoroscopic time has been changed, a functional test must be performed.

Programming the Organ Programs

Default organ programs have already been allocated at the factory with programs. The programming routine for customer specific organ programs is described in the document "UROSKOP Access User Manual".

Available Fluoroscopy Curves

NOTE

The fluoroscopy curves have been assigned through factory and MUST NOT be changed.

The default curves are listed in the document "Quality Assurance; IQAP".

The current fluoro curves can be viewed in the XCS SSW Help.

- Select "XCS Help" in the XCS program folder on your service PC.
- Select the menus "List of all tables" and subsequently "Fluoro curves".

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Functional Test of the Endoscopy Interface

- Once the system has powered up, no LED must light up at the endoscopy interface.
- On the hand control unit, press the "Ref / Endo / US" key to select the image source.
- If the optional system foot switch is used, switch over the image sources (functions) alternately at the hand control unit and the system foot switch.
- Every time the image source was switched over, the following LEDs must light up in sequence or remain dark at the optional endoscopy interface:
  - Endoscopy Input => Ultrasound Input => no LED => Endoscopy Input => etc.
- The reference monitor on the TFT support arm shows the reference image mask only if endoscopy/ultrasound is not selected. Otherwise, the reference image mask is switched off.

NOTE

When using/connecting an endoscopy camera, please observe the document "Troubleshooting Guide; Endoscopy Option" for settings.

NOTE

Although the two inputs (S-Video; Video) have the same function, the S-Video input is recommended because it offers better signal quality. If both inputs are supplied with a signal at the same time, only the S-video signal will be transmitted and visible on the monitor.

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Prerequisites

NOTE	**The connection of the UROSKOP Access to the Siemens Remote Service server has to be established and tested prior to the installation of System Management according document "Siemens Remote Service; Installation of SRS".**

NOTE	**System Management is another term for Magic Watch. It is based on HP agents.**

NAT

Among other things, NAT (Network Address Translation) makes it possible to remap inofficial IP addresses to official IP addresses.

If NAT is used, the local CSE who is listed in the SRS checklist receives the NAT IP address per email from CO CHS.

If there is doubt about whether NAT is being used, contact the responsible Project Manager.

NOTE	**For System Management it is necessary that the host name is not assigned more than once in the FLC, but is unique worldwide.** **It is recommended that the combination of the system part no. and system serial no. is used as host name, e. g. 5756122-05001.#** **It is also necessary for System Management that the FLC IP address remains constant after registering it on the Magic Watch server. DHCP may not be used, or must be configured so that the same IP address is always assigned.**

Changing the Host Name

The host name is changed in the FLC as follows:

- Start FLC service mode.
- Select "System/System Settings/Control Panel" in the service main menu.
- Double-click on the "System" icon.

  The "System Properties" window appears.
- Select "Network Identification".
- Click on the "Properties" button.
- Change the host name in the "Computer name" box and note it additionally in Tab. 1 (together with the workgroup and, if applicable, the domain name.
- Close the window with "OK".

  The "Do you want to restart your computer now?" window will appear.

- Close the window with "No".

Computer Name	
Workgroup	
Domain	

Tab. 1

Installation of Network Configuration

- Select "System/System Settings/Control Panel" in the FLC service main menu.
- Double-click on the "Network and Dial-up Connections" icon.
  - Double-click on "Local Area Connection".
  - Select "Properties" in the "Local Area Connection Status" window.
  - Double-click on "Internet Protocol (TCP/IP)" in the "Components checked are used by this connection" list box.

NOTE

Check the following entries.

Depending on the completeness of the network checklist which was provided through SP SCM to the Project Manager, the following entries have to be changed/made.

- Enter the value for "Preferred DNS Server" and note it additionally in Tab. 2.
- Enter the values for "IP Address", "Default Gateway" and "Subnet Mask" and note it additionally in Tab. 2.
- Close the window with "OK".
- Close all further windows with "X" in the upper right corner of the windows.

IP Address	
Subnet Mask	
Default Gateway	
Preferred DNS Server	

Tab. 2

- Select "System/System Settings/Control Panel" in the FLC service main menu.
- Select the "Folder" button in the Control Panel.

NOTE

The following steps apply to establish static routes for SRS/ System Management.

- Select "Explorer" in the FLC service main menu.

- Select the path "C:\WINNT\system32\".
- Double-click on CMD.EXE to open a command window.
- Enlarge the command window.
- Use the command "route -p ADD" as described below to establish both a static route to SRS Server and System Management Server.

NOTE

The syntax for the "route" command is as follows: route -p ADD "IP address server" "IP address gateway" [e. g. "route -p ADD 194.138.39.18 157.163.201.188"].

The IP addresses of both SRS Access Server and System Management Server are listed in .

1	SRS Access Server		System Management/Magic Watch Server	
	IP Address	Server Name	IP Address	Server Name
Europe & Middle East	194.138.39.18	lux09505	194.138.39.19	lux09330
America	129.73.116.92	srsacc1	129.73.116.91	srsmon1
Asia	194.138.243.178	sgpt806x.siemens.com.sg	194.138.39.19	lux09330

Tab. 3 Table D with title cells

- Close the command window with "X" in the upper right corner of the window.

Configuration of System Management

NOTE

Prerequisite for the following configuration steps of System Management is that the SRS router is set up correctly (refer to document "Siemens Remote Service; Installation of SRS"). Otherwise the system management installation will fail.

SNMP Configuration

- Double-click on the "Administrative Tools" icon in the Control Panel.
- Double-click on the "Services" symbol.
- Double-click on "SNMP Service" in the list.

  The "SNMP Service Properties" window will appear.
- Select the "Traps" tab card.
- Enter "magicwatch" as "community name" and press the "Add to list" button.

- Press the "Add..." button under "Trap Destinations".

  The "SNMP Service Configuration" window appears.
- Enter the IP address of the appropriate Magic Watch server (Tab. 4) and conclude with "Add".
- Select the "Security" tab card.
- Check whether only "magicwatch" is entered as the "Accepted Community Name". If not, proceed as follows.
  - Click on all the other entries and delete them with the "Remove" button.
  - Press the "Add..." button and enter "magicwatch" as the "Community Name".
  - Select "READ ONLY" from the "Community Rights" list box.
  - Close the selection window with "Add".
- Check whether the IP address of the responsible Magic Watch server is listed under "Accept SNMP packets from these hosts" (Tab. 4). If not, proceed as follows.
  - Select the "Accept SNMP Packets from These Hosts" radio button.
  - Press the "Add..." button.
  - Enter the corresponding IP address in the "SNMP Service Configuration" window.
  - Close the window with "Add".
  - Close the "SNMP Service Properties" window with "OK".
  - Close the "Services" and "Administrative Tools" windows.
- Select the "System Boot" tab card.
- Select the "Reboot" button.
- Wait until the application has restarted.

Installation of System Management

- Start the FLC service mode.
- Select "System" in the service main menu and subsequently the "Magic Watch" task card (Fig. 1).

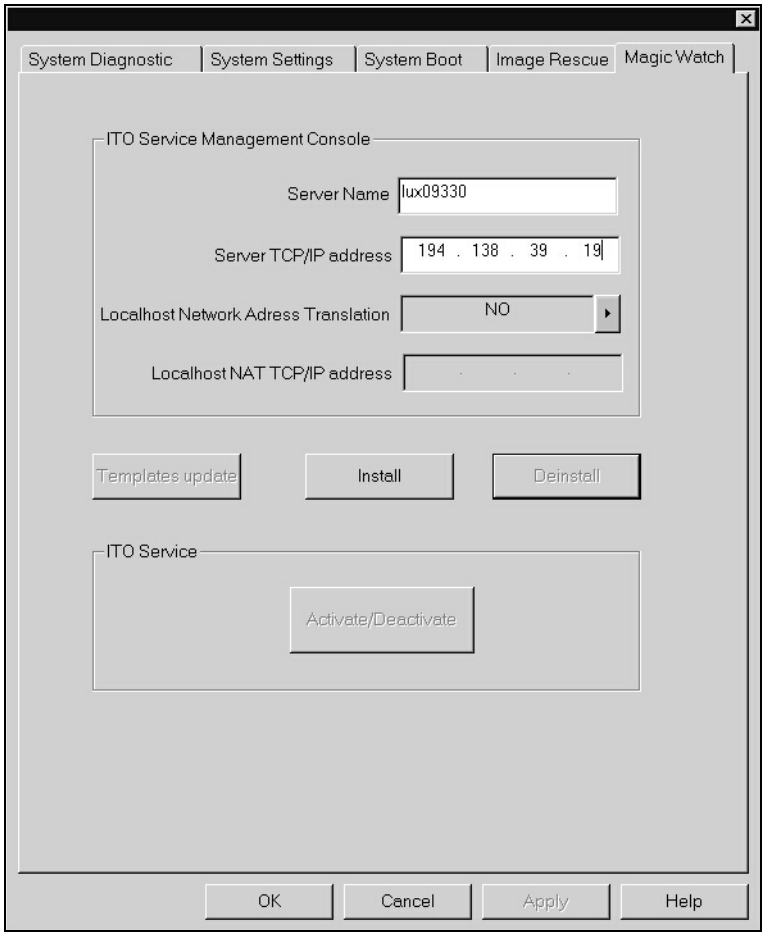

Fig. 1

- Enter the "Server Name" and the appropriate "Server TCP/IP address" (Fig. 1) of the System Management server of your time zone (Tab. 4).

Time zone	Server Name	Server TCP/IP address
Europe	lux09330	194.138.39.19
America	srsmon1	129.73.116.91
Asia	lux09330	194.138.39.19

Tab. 4

- If NAT is being used, activate the "Local Host Network Address Translation" menu item by selection the button.

  "Yes" is played.

NOTE **Ask your local network administrator for the NAT IP address.**

- Enter the NAT IP address and click on the "Install" button.

A command window will appear in which the progress of the installation routine is displayed.

NOTE

Once the installation routine has been completed, the message "Magic Watch installation successful" appears in the "FLC_V4" window.

- Close this window with "OK".

Installion failed

- If the System Management installation fails, a window with the following message appears: "Magic Watch installation not successful".
- VIew the installation certificate as follows:
  - Select the "Explorer" button in the FLC service main menu.
  - Select the path "C:\TEMP" and view the "event_agent.log" file by double-clicking on the file.
  - The message "Magic Watch installation successful" must be displayed in the last line.

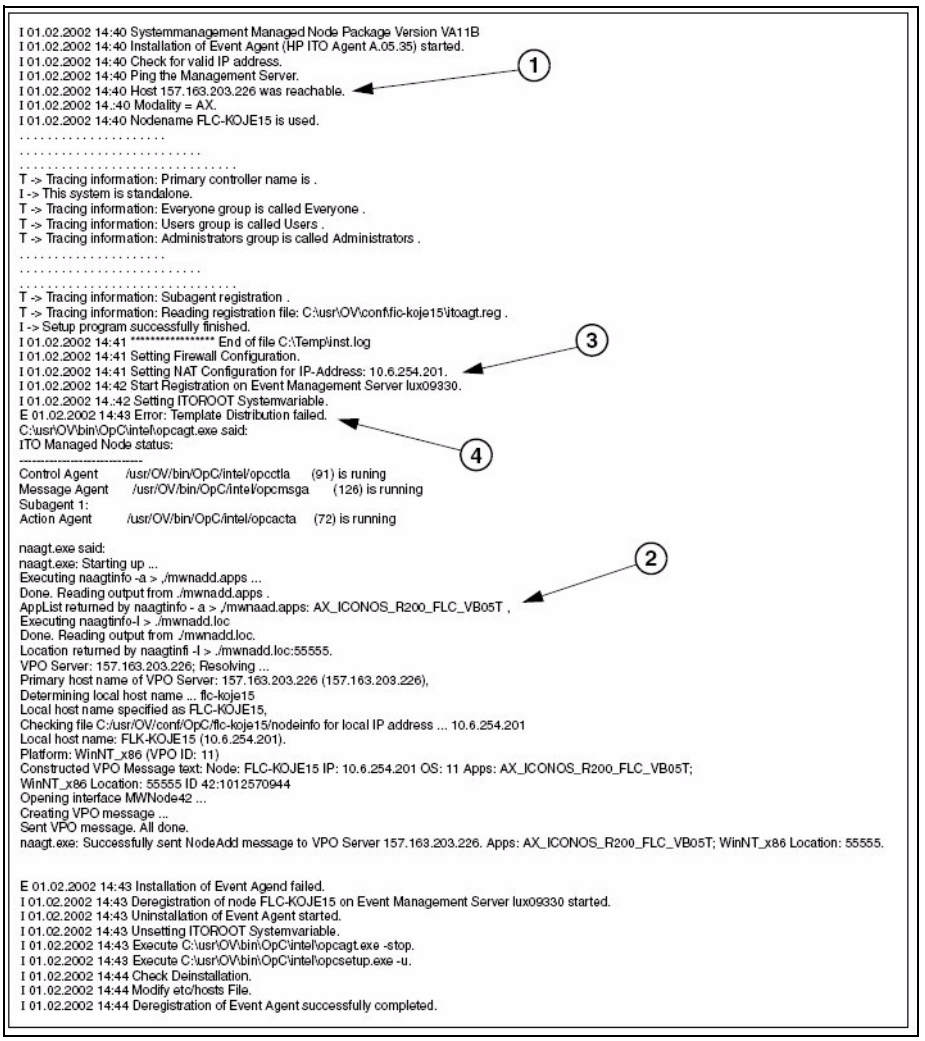

Fig. 2

Fig. 2 shows an excerpt from the "event_agent.log" file of a failed installation, for which there are several reasons:

- Check if the correct IP address was entered for the System Management server (1/Fig. 2).
- Check if NAT is being used, but the "NAT" menu was not changed to "YES" in the configuration.

  The "Setting NAT..." line displayed in (3/Fig. 2) is missing.
- Check if an incorrect NAT IP address was entered (3/Fig. 2).
- Check if the template distribution failed.

  It is possible that despite an existing ping connection and entry of the correct data for the Magic Watch server, IP address, Magic Watch server name, FLC NAT IP address, no templates were distributed. (4/Fig. 2) shows this failure.

  - The installation routine has to be started again.

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Covers

- Attach all covers to the lifting base and the unit.

Activating the Variable XCU Password

- Start XCS SSW.

  The following window appears.

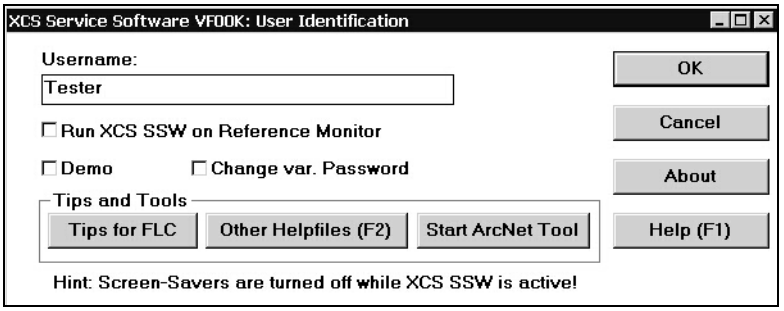

Fig. 1

- Confirm this window with "OK".

  The XCS SSW window appears.

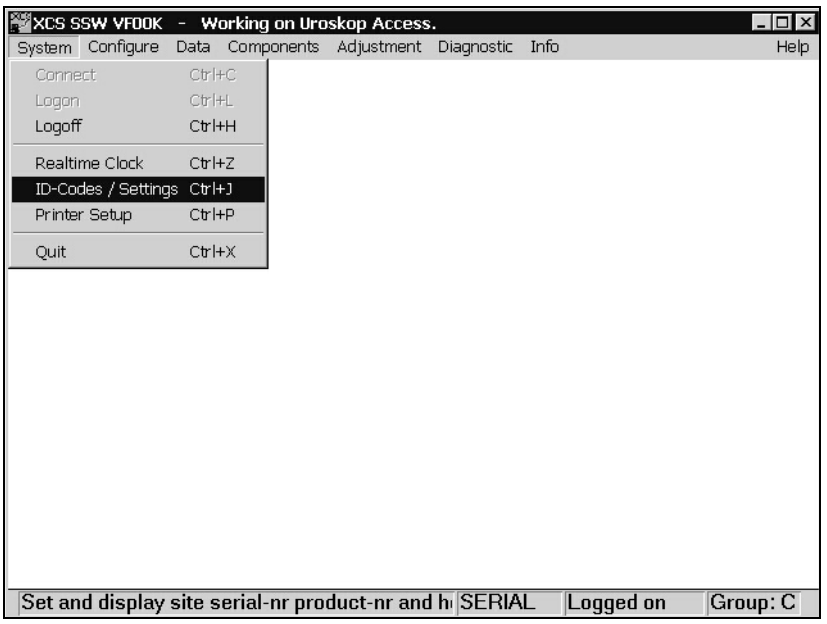

Fig. 2

- Select the "System > ID-Codes/Settings" menu.

  The following window appears.

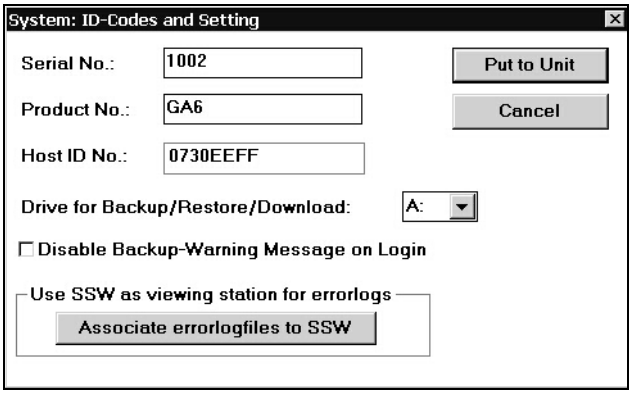

Fig. 3

- Check if the entry of the "Serial No." is the system serial no. (see chapter 5; subchapter "Checking Data in the XCU").
- Check if the entry of the "Product No." is "GA6".
- Confirm the "System: ID Codes and Setting" window (Fig. 3) with "Put to unit" if you have made any changes.
- Select "System > Logoff" in the XCS SSW window (Fig. 4).

  The following window appears (Fig. 5).

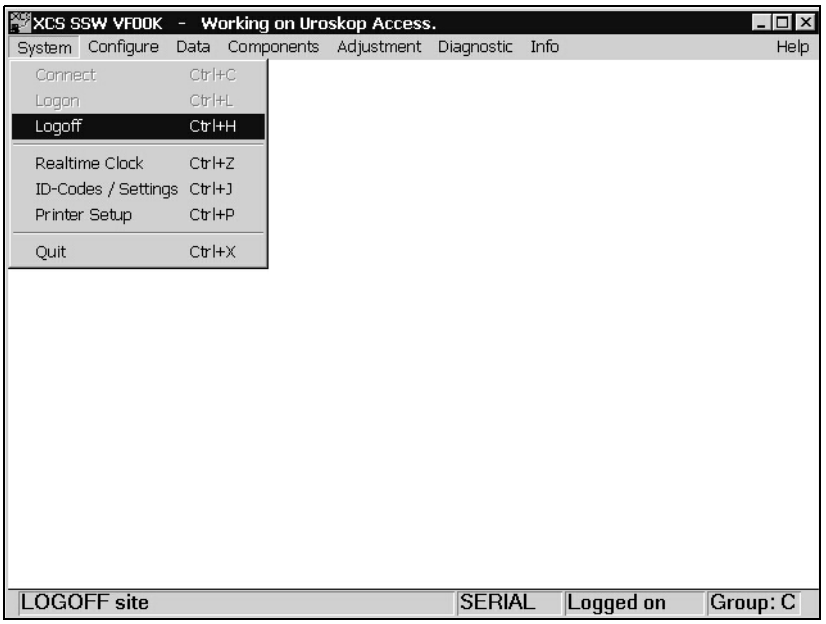

Fig. 4

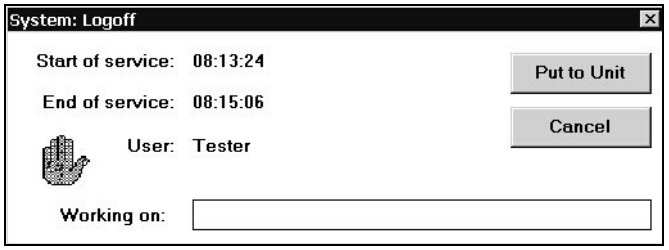

Fig. 5

- Confirm this window with "Put to Unit".
- Close the XCS SSW window with the "X" in the upper right corner of the window.
- Start XCS SSW again.

  The following window appears (Fig. 6).

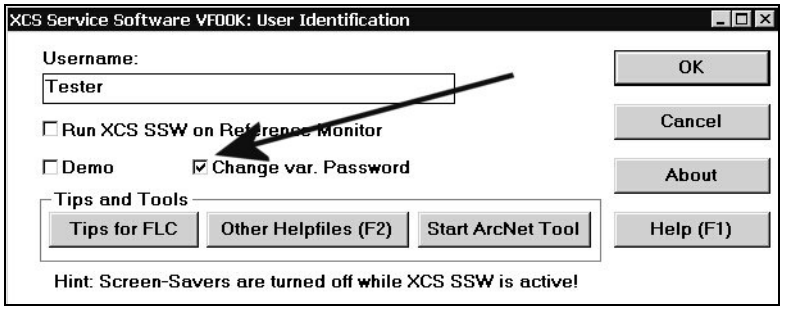

Fig. 6

- Set the "Change var. Password" checkbox and confirm the window with "OK".

  The following window appears.

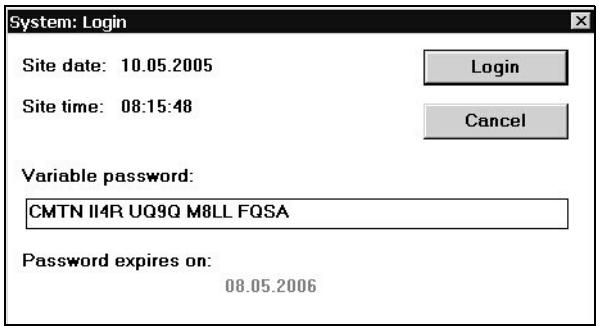

Fig. 7

- Enter the variable password as written in the "service.txt" file on the license disc (Fig. 8) in the "System: Login" window (Fig. 7) and confirm with "Login".

NOTE	**The last six characters of the variable password are the variable password for the FLC service.**

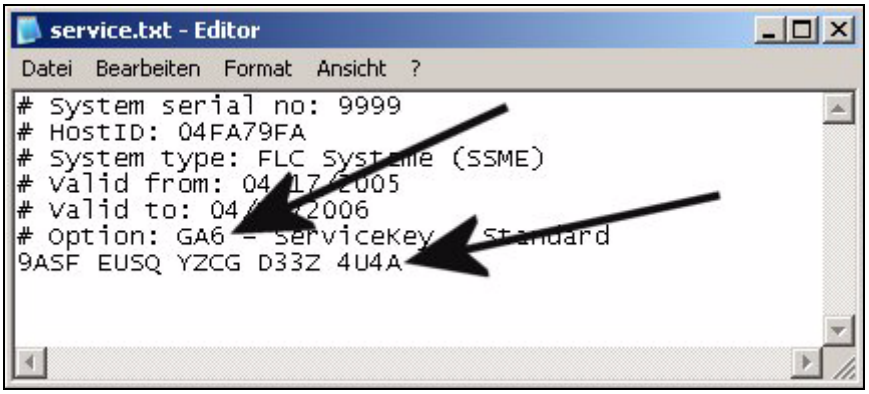

Fig. 8

If the variable XCU password has expired, please contact the CS HSC Licensing Center to get a new one.

The following data must be available to generate a variable password:

- Host ID,
- System Serial No.

Determine the Host ID as follows:

- Start the XCS SSW.
- Read out the XCU ID under the "System > ID-Codes/Settings" menu.

Deleting the Exposure Counter

- In the XCS SSW program, select the "Info/Operating Time" menu.
- Select the "Erase tube 1" button.
  - Confirm the message "Erase tube date?" with "Yes".

Backup of Site Data

NOTE	**On completion of the startup, perform a backup.**

- Insert the backup disk (Site data disc) into drive a: of your service laptop.
- In the XCS SSW program, select "Data/Backup to disk" and start the backup procedure with "OK".

Deleting the XCS Error Log

- In the XCS SSW program, select the "Diagnosic/Error Log" menu.
- Select "Get from unit".
- Select "Delete in unit" and confirm the "Question" window with "Ja".
  - Save the error log to disk. During the initial period of system operation the log must be evaluated and may be used for comparison.

- Close the error log menu with "Close".
- Exit the XCS SSW program with "System/Quit".

Finishing the Certificates

- On completion of all settings and check measurements, the technician carrying out the work must sign and date the test certificates (UROSKOP Access test certificate, POLYDOROS test certificate) and country-specific certificates (e. g. DHHS, RöV §16) to confirm that all values were determined and recorded correctly.

Completing the Document "Installation Protocol"

The manufacturer of this product requires information and the legislator demands proofs that a product delivered free of defects from the factory continues to possess the required and certified quality properties on installation and start-up.

It is therefore absolutely necessary that the installation report with the installation and start-up data is sent without delay after completion of the work to the address stated on the installation report.

You will find the report in the system binder.

Checks and Tests

Checking the Accessories

- Check the supplied accessories for completeness and damage.

Checking Image Reversal

- Select a patient at the imaging system.
- Place the test object "R" on the tabletop in the center of the radiation field so that it is legible from the unit base side.

The LEDs of buttons no. 32 and no. 33 at the tableside control unit are not illuminated.

- Press the button no. 32 "Preselect flip vertical" at the tableside control unit.

The LED of button no. 32 is illuminated.

- Release Fluoro.

The test object is displayed as follows.

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- Press the button no. 33 "Preselect flip horizontal".

The LEDs of buttons no. 32 and no. 33 are illuminated.

- Release Fluoro.

The test object is displayed as follows.

- Press the button no. 32 "Preselect flip vertical"

  The LED of button no. 33 is illuminated.

- Release Fluoro.

  The test object is displayed as follows.

- Press the button no. 33 "Preselect flip vertical".

  The LEDs of buttons no. 32 and no. 33 at the tableside control unit are not illuminated.

  The test object is displayed on the monitor as follows.

Testing the System Emergency Shutdown Button (If Available)

- On actuation of the system emergency shutdown button, the entire system must be disconnected from the mains supply.

Functional Test of the Emergency Stop Buttons

- Actuate the emergency stop buttons on the remote control console and on the unit.

  Safety contactors K1, K2 drop out audibly.

- Unlock the emergency stop buttons.

  Safety contactors K1, K2 pick up audibly.

Testing the Protective Ground Wire

NOTE

The following final ground wire test must be performed for the safety of startup personnel.

The final ground wire test is performed at the end of the startup procedure. Therefore the documentation applies only to this test which delivers the initial measurement value.

The initial measurment value is used as a comparative value for subsequent measurements and must be documented.

- Perform the ground wire test according DIN VDE 0751, part 1 (ARTD part 2). It has to be ensured that the system is completely installed, all covers are attached and all ground wire connections have been made. Test the protective ground wire resistance between

the protective conductor bus bar for the entire system or the protective contact at the unit plugs and any accessible, conductive part of the product that can accept voltage in cases of error.

The acquired measuring values have to be documented and evaluated together with information about the used measuring device (type and serial number).

The protective ground wire resistance may not exceed 0.2 Ohm.

NOTE	**Ensure that control or data cabeling does not affect ground wire connections.**

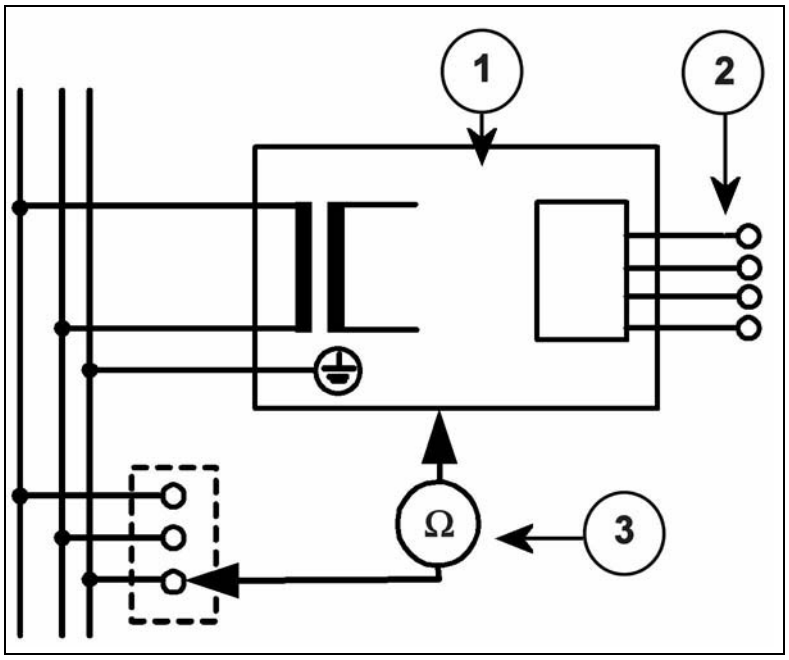

Fig. 9 Measurement circuit for protective ground wire measurement of systems with hard-wired connections; according DIN VDE 0751-1:2001-10, C3
1 = System
2 = Applied part type B
3 = Measurement application (integrated in measuring device)

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